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IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF OHIO
EASTERN DIVISION

LOCAL 17 INTERNATIONAL ASSOC. OF BRIDGE & IRON WORKERS INS. FUND,

Plaintiff,

vs.

PHILIP MORRIS, INC, ET AL,

Defendants.

Civil Action No. 1:97CV1422

Akron, Ohio

VOLUME 6

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TRANSCRIPT OF JURY TRIAL HAD BEFORE THE HONORABLE JAMES S. GWIN, JUDGE OF SAID COURT, ON MONDAY, MARCH 1, 1999

AT 8:00 O'CLOCK A.M.

- - -

APPEARANCES:

For Plaintiffs: PATRICK J. COUGHLIN, ESQ.
JOHN MONROE, ESQ.
MICHAEL DOWD, ESQ.
Milberg, Weiss, Bershad, Hynes & Lerach
& Lerach
600 West Broadway, Suite 1800
San Diego, CA 92101
MICHAEL E. WITHEY, ESQ.
Stritmatter Kessler Whelan Withey
1200 Market Place Tower
2025 First Avenue
Seattle, WA 98121
ROGER M. ADELMAN, ESQ.
Suit 730
1100 Connecticut Avenue, N.W.
Washington, D.C. 20036

JACK LANDSKRONER, ESQ.
The Landskroner Law Firm
55 Public Square, Suite 1040
Cleveland, OH 44113
EBEN O. MCNAIR, IV, ESQ.
Schwartzwald & Rock
616 Bond Court Building
1300 East Ninth Street
Cleveland, OH 44114-1503.

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For Philip Morris, Inc: BRADLEY E. LERMAN, ESQ.
GEORGE LOMBARDI, ESQ.
Winston & Strawn
35 West Wacker Drive
Chicago, IL 60601-9703

For Lorillard Tobacco Co: GARY R. LONG, ESQ.
GREGORY L. FOWLER,

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ESQ.
Shook, Hardy & Bacon
One Kansas City Place
1200 Main Street
Kansas City, MO
64105-2118.

For RJR Nabisco, Inc,: R.J. Reynolds Tobacco, RJR Nabisco Holding
ROBERT C. WEBER, ESQ.
Jones Day Reavis & Pogue
North Point 901 Lakeside Avenue
Cleveland, OH
44114-1190

For Brown & Williamson and BATCo:
DAVID BERNICK, ESQ.
MICHELLE H. BROWDY, ESQ.
Kirkland & Ellis
200 East Randolph Drive
Chicago, IL 60601

Court Reporters:
Richard G. DelMonico
Joan Zengler
U.S. District Court
2 South Main Street - 4th Floor
Akron, OH 44308
(330) 535-2280, 535-1823

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(The following proceedings were conducted outside the presence of the jury:)

THE COURT: I'm sure you have some questions, it's come to our attention you may be a beneficiary under this, and I think there had been some discussion, but we had thought that the fund you were attached with wasn't a part of this case, and --

JUROR NUMBER 12: I don't think it is but.

THE COURT: It may be.

JUROR NUMBER 12: Okay.

THE COURT: Let me ask, I release you from the earlier instructions, but I think I would strongly encourage you without ordering you not to talk about the case or your impressions.

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JUROR NUMBER 12: I won't.
THE COURT: When we have a verdict, you are free to talk to whoever you wish. But don't engage in it. Sometimes attorneys want to investigate it or people want to pick your brain or what your interim impressions were, but you agreed with us you wouldn't reach an opinion until all the evidence was in. Your earlier impressions would be subject to change. I think it is for your benefit and our benefit. It is best you stay away from having any conversations with either family members or friends or anybody else.

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JUROR NUMBER 12: Okay.
THE COURT: Thanks for being with us. I apologize for not understanding this earlier, because we wouldn't have -- not wanted to inconvenience you in terms of spending the week. You know more about smoking now than you ever wished.
JUROR NUMBER 12: That's true; that's true.
THE COURT: Thanks a lot.
MR. WEBER: Thank you.
THE COURT: Could you have him get his stuff. I would rather him not go back with the other jurors until we bring them in.
JUROR NUMBER 12: My coat is the only thing in there.
(The jury was returned to the courtroom and the following proceedings were conducted in open court:)
THE COURT: If the jury will please be seated. I would just indicate to the jury that I excused juror number 12. After some further review, the court learned that he was actually one of the beneficiaries of one of the funds that is involved in this litigation. We had not thought that to be true originally, but after some further checking we found that out. And for that reason, I've excused juror number 12. Which just allows me

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an
25 opportunity to reiterate. We have invested a lot of time

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1 at this point in this case, it is moving along. It's
2 absolutely incumbent upon everyone of you to make sure you
3 are here every day. We'll go forward now with 11 jurors,
4 but it's very, very important that each of you continue to
5 be as diligent as you have in terms of reporting for
6 service each morning. So, I extend the thanks to you for
7 the service you have given so far, but reiterate the
8 importance of you getting here every day. So, I will at
9 this point in time call upon the plaintiff to call your
10 next witness.
11 MR. COUGHLIN: Your Honor, we would call Dr.
12 Neal Benowitz. Good morning ladies and gentlemen.
13 NEAL BENOWITZ
14 called as a witness by and on behalf of the Plaintiff,
15 being first duly sworn, was examined and testified as
16 follows:
17 THE COURT: Good morning.
18 THE WITNESS: Good morning.
19 THE COURT: If you would help us by stating
20 your name and spelling your last name for the court
21 reporter.
22 THE WITNESS: It's Neal Benowitz. N-E-A-L,
23 B-E-N-O-W-I-T-Z.
24 THE COURT: Mr. Coughlin.
25 - - -

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1 DIRECT EXAMINATION
2 BY MR. COUGHLIN:
3 Q. Good morning, Dr. Benowitz?
4 A. Good morning.
5 Q. Dr. Benowitz, you understand you are here to talk
6 about how nicotine controls smoking behavior and how the
7 tobacco industry optimized the cigarette design to insure
8 the optimal delivery device of nicotine?
9 A. Yes.
10 Q. Dr. Benowitz, each of the cigarette companies in this
11 case has asserted whether to smoke or not is the

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free
choice and will. Have you ever heard those assertions?
A. I have.
Q. Do you have an opinion about that?
A. Yes.
Q. And what's that opinion?
A. The question of free will is complex. It's a yes and no answer.
The yes part of it is that smokers' brains work perfectly well, nicotine does not have any impairment on thinking or on making decisions. Smokers make valid decisions about all aspects of their life, except when dealing with smoking.
Therefore the reason is, when a person makes a decision it's influenced by many factors, all decisions

are. If a person is deciding about smoking, the decision is made on reasons to stop smoking, which may be health concerns for one's self, health concerns for one's children, the fact that one's family wants you to stop smoking, the cost of smoking. So, those are some of the factors that weigh for a person to stop.
The factor that weighs to keep a person smoking is nicotine addiction. It's that when they quit smoking, their lives are often disrupted, they can't think right, they can't concentrate, can't focus, become irritable, have trouble with the job, don't feel good, have trouble finding pleasure in lots of things in one's life. Don't -- have problems dealing with stress.
A number of things occur in many smokers that makes the quitting process extremely uncomfortable and really impairs their functioning, and smokers learn that, and that becomes a very strong factor in the balance of whether to smoke or not.
One can look at two aspects of the free will choice that I think illustrates this for smoking. One is whether a person's decisions are internally

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consistent.
Normally, you expect a person to make one decision and then other decisions that are consistent with one another.
One of the things that is well known is that many smokers, 70 percent of smokers would like not to

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smoke. 35 percent of smokers make a serious quit attempt each year, they quit for at least a day trying to stop smoking. Only one in ten succeed.
The average smoker, when they do quit, has tried four, five times and has failed.
One obvious question is, what is it that makes a person want to quit, to try to quit many times, and have such a low success rate and fail many times, often taking years to quit when their stated desire is they don't want to smoke. I don't think that's just from the flavor of cigarettes. It's because people are addicted to nicotine.
A second way of looking at it has to do with behaving in a way that's not self-destructive. Most people, unless they are suicidal, will not do things that they know will hurt them. In the case of cigarette smoking, most smokers know that cigarette smoking is harmful to health.
Many smokers have been told by doctors that they should stop smoking. Even if one looks at the extreme situation of people who have had smoking related diseases like heart attacks where doctors say smoking is the worst thing for you, it's going to double or quadruple your chance of dying in the near future, 50 percent of smokers keep on smoking in spite of that advice.
These smokers who keep on smoking in spite of

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health problems are not suicidal people. They are not generally self destructive. The only

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self-destructive
thing they do is smoke cigarettes. That is not motivated by someone liking the flavor of cigarettes, that is motivated by nicotine addiction.

Finally, my practice is cardiology. And one patient of mine, which I think is a very good example of this, is a man in his 50's who has been a heavy smoker his whole life. He has high blood pressure, high cholesterol, he's had a heart attack, he's had bypass surgery, and continues to have chest pain in spite of smoking cigarettes.

I say you have to stop smoking. It is going to kill you. He tells me I know that, but I can't stop. If I don't have cigarettes, I can't think, I can't function, I don't feel good. If I can't smoke cigarettes, I don't care if I live or if I die.

This is a man who's not suicidal, but the decision, free choice decision is so influenced by dependence he would choose dying over living.

Q. Thank you, doctor. You started to tell us what you did in your practice. What is your practice?

A. Well, I'm on the faculty at the University of California, San Francisco. I teach internal medicine. I spend about a third of my time in patient care, most of it

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is internal medicine or cardiology. I also do clinical pharmacology and toxicology, which has to do with drug issues.

I spend a fair chunk of my time involved in hospital affairs, involved in drug use policies, not drug abuse, but actually pharmaceutical drugs and teaching.

And I spend a fair amount of time in research. And most of my research for the past 25 years has been on the question of what nicotine does to people, how nicotine influences cigarette smoking, and smoking related

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diseases.
Q. Have you received any honors or awards?
A. Yes, the two awards which I'm most proud, one was the
Ovay Fairno Award which is an international award given for
distinction in research on nicotine, tobacco and health.
And I received that award two or three years ago. And then
the second award was the Alton Oxner Award. Alton Oxner
was the surgeon who started the Oxner Clinic in New
Orleans. And every year an award is given for
contributions to understanding smoking and health. And I
received that award about two years ago.
Q. And do you lecture at the Mayo Clinic?
A. I also received an award at the Mayo Clinic. They
have a distinguished scientist lecture each year, and I
gave that lecture three years ago, talking about my

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research on nicotine, tobacco and health.
Q. Are you a member of any professional organization?
A. Yes, a number of organizations, probably 6 or 8,
dealing with various aspects of internal medicine,
pharmacology, and in nicotine and tobacco there is an
organization, the Society for Research on Nicotine and
Tobacco, I was President of that society a couple years
ago.
Q. Have you been involved in drafting any of the Surgeon
General reports?
A. Yes, I've participated in quite a few of the reports.
I was one of the senior scientific editors of the 1988
Surgeon General's report on nicotine addiction.
Q. And that specifically dealt with nicotine and its
addictive properties, is that right?
A. That's correct.
Q. And as senior editor what were your responsibilities
there?
A. Well, the Surgeon General's report is a document that
tries to assemble all the existing scientific information
about one topic in smoking and health. The topic is chosen
by the Surgeon General, and then there is a

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senior
23 scientific editor or editors who work with the director of
24 the office of smoking and health, to either write or ask
25 other experts to write different sections of a compendium

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1 on a topic.
2 In our case it was what nicotine did to the
3 brain, how nicotine maintains smoking behavior, and
4 aspects of treating nicotine addiction. As a senior
5 scientific editor I wrote some sections. I got other
6 people to write sections. The editors then took the
7 documents written by other people, we rewrote those into a
8 single document, we sent those out for review by a number
9 of scientists around the country, got comments back,
10 revised it, again developed the full document, sent it out
11 to scientists around the world, got their comments,
12 revised it again, and ended up with a consensus document
13 which was then delivered to the Surgeon General for his
14 review and release.
15 Q. Okay. You said something earlier about the cigarette
16 being a nicotine delivery device. Can you explain what you
17 mean by that?
18 A. Yes, if you think about any drug that a person takes,
19 it gets into the system by some delivery system. For
20 example, a pill or a patch or a spray, an inhaler an
21 injection. In the case of nicotine, the delivery device is
22 a cigarette, and that turns out to be probably the best way
23 to deliver an addictive device to an individual.
24 Q. Why is that?
25 A. When you smoke a cigarette, what occurs is that the

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1 cigarette begins to burn, it generates a mist or an aerosol
2 of particles, which are the tar particles. Those particles
3 contain nicotine and tar and water. And then gasses, a
4 number of gasses that carry the particles out.

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When a person inhales a cigarette, the particles and gas get taken down into the lungs, nicotine is absorbed very quickly through the lungs into the blood circulation, and within about 10 seconds of a puff, nicotine goes to the brain in very high concentration.

The puff enters the lungs at one time. It gets absorbed quickly at the blood stream so there is a pretty high level that goes to the brain over a short time. And the faster a drug gets to the brain and higher the concentration, the more intense the effect.

The second part about it is that smokers can sense how much nicotine they are getting from the cigarette. So, they change their puffing from puff to puff, because they are getting feedback as to how much nicotine. So, it's a way that they take a drug, they get an effect, they can adjust their smoking behavior to titrate that effect. So, not only for fast delivery, high concentrations, but the dose can be very carefully titrated and controlled by the smoker.

All of these things really make it the best delivery system for a psychoactive drug in terms of self

administration.

Q. Did the tobacco industry realize and understand this?

A. Yes, the tobacco industry has understood this extremely well.

Q. If we could take a look at Exhibit 1054. Doctor, I'm showing you an Exhibit 1054, a document written by William Dunn a principal scientist for behavior research at Philip Morris in the early '70's. Can you tell us a little bit about this document?

A. This was a document that was presented at a conference for smoking researchers in, I think, 1972 or 1973. Phillip Dunn was one of the organizers of the

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conference. And he delivered a paper that dealt with the question of why do people smoke cigarettes. And in this document he very clearly articulates the concept that the cigarette is really a delivery device for nicotine, and his text is very clear about that.

Q. Let's take a look at inside the document if you can point what you are referring to, if we can blow that up?

A. Okay, on page 4 he states that, most of the conferees would accept the proposition that nicotine is the active constituent of cigarette smoke. Without nicotine there would be no smoking. And some evidence to support this argument include that no one has ever become a cigarette smoker, smoking cigarettes without nicotine; that most of

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the physiological responses to smoke are nicotine related; and that despite many low nicotine brands being introduced, none of them have captured a substantial segment of the market.

He goes on on the next page, page 5.

Q. If you could blow that up.

A. And here he goes on to say, why is there not a market for nicotine per se that can be eaten or drunk or injected or held as a pure aerosol. And he states the cigarette is in fact the most awe-inspiring examples of the ingenuity of man, and states that the cigarette should be conceived not as a product in a package. The product is nicotine. The cigarette is one of many packaged layers. There is a carton and pack which contains a cigarette which contains the smoke, and the smoke is the final package.

He goes on to say, think of cigarette pack as a storage container for a day's supply of nicotine. Think of the cigarette as a dispenser for a dose unit of nicotine. And he's -- on the next page.

Q. Before we go there, could you explain, it says its rate of combustion meters the dispensing rate,

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there under
22 number 2 at the bottom. Can you explain what
that is?
23 A. Well, this is, here he is talking about
some of
24 the -- some of the aspects of a cigarette that
make it
25 particularly useful as a drug delivery device.
And the

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1 first one is that it's readily activated so you
can light
2 it up and carry it around so you can get the
drug easily.
3 The second is what I said before,
that by how
4 you smoke the cigarette, you can control the
dose of
5 nicotine that you get. And that's extremely
important in
6 terms of the psychoactive drug where you want
to get
7 a certain effect from it.
8 And then the third point here is
that
9 dispensing it, which means smoking a cigarette,
is
10 unobtrusive to most behaviors. So, you can
smoke a
11 cigarette while you are working, watching TV,
talking to
12 your friends. So, it is the drug delivery
system you can
13 use in an ongoing way. It's not a matter of
injecting a
14 drug or having to pop pills. You can do it as
you go
15 along in your daily lives.
16 Q. Does that have an impact on the smoker?
17 A. It does because the easier it is for a
person to use
18 a drug, then the more likely a person is to use
that drug
19 to deal with daily life stresses, and the more
likely one
20 is to titrate up in optimal dose of nicotine.
That's
21 important for smoking behavior. People tend to
take in a
22 similar amount of nicotine from day-to-day, and
that's got
23 implications in terms of products.
24 Q. Was Philip Morris the only company that
understood
25 this?

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1 A. No, all the tobacco companies have
internal documents
2 that address cigarettes as effective nicotine
delivery
3 devices.

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Q. Let's take a look at Exhibit 1087. This is a 1972 memo from Claude Teague from RJR, he's a senior scientist there, did you review this document?
A. Yes.
Q. Can you tell us what the significance of it is?
A. Well, this is a memo from Claude Teague discussing the importance of nicotine to the tobacco industry. And really saying that we are a pharmaceutical industry, our product is nicotine. That's the bottom line of this document.
Q. Let's flip into the first page, and blow up the top paragraph.
A. In the very first sentence he states this explicitly, that in a sense the tobacco industry may be thought of as being a specialized, virtualized, stylized segment of the pharmaceutical industry; that tobacco products uniquely contain and deliver nicotine, which is a potent drug with a variety of physiological effects.
He goes on on that page in the bottom paragraph and just says our industry is based on designing, manufacturing and selling dosage formulas of nicotine. And our companies position and industry is determined by

our ability to produce dosage formulas of nicotine which add more value to the consumer than our competitors.
Q. Has it been your understanding that was the public stance of the industry, that they were in the pharmaceutical business and selling a drug?
A. No, the public stance has been the opposite, to play down nicotine as a flavoring agent mostly, and certainly to play down the question that people are using cigarettes to self-administer a drug.
Q. Did the industry understand dosage?
A. Yes, they understood, and many documents deal with the question of optimizing dosage of nicotine for the smoker.
Q. If we could take a look at Exhibit 2107.

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This is a
15 1980 Lorillard document, and it's from Richard Smith of
16 Lorillard, and one of the recipients is Dr. A. W. Spheres
17 who initially became CEO of Lorillard, senior scientist at
18 the time. Could you tell us the significance of this
19 document?
20 And can you blow up the yellow part?
21 A. Well, this is a document which is dealing with some
22 aspects of designing cigarettes and question of how much
23 nicotine should cigarettes deliver. And they state here
24 very explicitly in this study that one of their goals is to
25 determine the minimum level of nicotine that will allow

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1 continued smoking. And this has been a very common theme
2 of the industry. There has been pressure from the
3 government to reduce nicotine and tar yields. The industry
4 knows that people are smoking for nicotine and knows that
5 people will not accept too little nicotine from their
6 cigarettes, and so documents like this, and many others
7 have said what is the level of nicotine we must have in I
8 our cigarette to guarantee that people will continue to
9 smoke.
10 Q. And did all the industry participants understand that
11 and work on that design to deliver the minimum dose needed?
12 A. Yes, there are documents that talk about minimal dose
13 of nicotine in all the company's documents.
14 Q. Let's take a look at Exhibit 3496-B. This is an RJR
15 T 1991 document, and it's called the Rest Program Review.
16 Can you tell us what that is?
17 A. Yes, the Rest Program is one of the ways that the
18 tobacco companies can control the nicotine content of
19 cigarettes. And basically what happens in this is that
20 tobacco products, leaves, stems, whatever, are chopped up,
21 and then nicotine and other soluble components are
22 extracted, the solid materials are then

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processed to make
23 something that's like tobacco leaf, and then nicotine and
24 flavorants are added back. But nicotine is added back in a
25 controlled fashion so that every cigarette can have exactly

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1 the amount of nicotine that the manufacturer wants to be
2 there.
3 Again, it's a very important part of the fact
4 that once you determine what an acceptable dose is, you
5 want to make sure that every cigarette has enough nicotine
6 to satisfy the smoker.
7 Q. Let's take a look inside this document. Can you blow
8 up those two paragraphs.
9 It talks about key issues, and if you could
10 explain what the first one addresses?
11 A. Well, the first one is what I was talking about, they
12 can use this process to independently control nicotine
13 delivery from very low to high levels to address consumer
14 wants and as a research tool. Another issue there, and
15 that issue five relates to reducing biological activity of
16 smoke.
17 Q. What does that mean?
18 A. Well, the issue here, in terms of biological
19 activity, has to do with the things that cause disease, to
20 make the cigarettes less hazardous, if possible.
21 Q. And this is an internal document of RJR?
22 A. Yes.
23 Q. Let's flip into it where they talk about the control
24 nicotine process. And what does this, what does this --
25 what's this page referring to?

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1 A. Well, this is again talking about this rest process
2 and really saying that one of their goals is to develop
3 total control of nicotine content in a product without
4 affecting smoking performance.
5 And they just restate what the other RJR
6 document says, that we are basically in the nicotine
7 business, it is in the best long term interest

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of RJR to
8 be able to control and effectively utilize every pound of
9 nicotine we purchase, and effective control of nicotine in
10 their products should equate to a significant product
11 performance and cost advantage.
12 Q. So, they related the nicotine dosage to a cost
13 advantage; is that right?
14 A. Well, not nicotine dosage per se, but this is really
15 sort of making use of every milligram of nicotine in the
16 optimum way to save cost. So, it is really to use their
17 nicotine, which means they could extract it from one batch
18 and use it in a second batch, whatever.
19 Q. And is that the position the tobacco industry took
20 when you were with the Surgeon General's office, working on
21 that report?
22 A. Well, I had no I input from the tobacco industry when
23 I was working for the Surgeon General. The public
24 statement has been that our products are natural products,
25 they're things that we just select and blends good tasting

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1 tobacco leaves.
2 Q. And did the industry understand the impact that
3 nicotine had, the pharmacological impact that nicotine has
4 on the body?
5 A. Yes.
6 Q. If we could take a look at Exhibit 1444, could you
7 tell us, could you tell us what this is? This is the
8 research report generated in October of 1995; do you see
9 that?
10 A. 1975.
11 Q. '75, I'm sorry?
12 A. Yes this a Philip Morris internal document.
13 Q. And can you tell us what the significance of it is,
14 if we can go on to the first page?
15 A. This is the document that is following up on what we
16 just talked about, trying to determine what is the optimal
17 dose of nicotine for a smoker, and starts out by restating
18 that nicotine is the main determinant for

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sustaining the
smoking habit.
Nicotine is well known to provoke pharmacologic
effects. And they talk about some of those. They say
apparently there is a optimal nicotine. Too little or too
much is rejected by the smoker. It is therefore of
importance to determine the limits of acceptability of
cigarettes, how low a nicotine yield will be satisfied to

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the smoker.
Q. And was there evidence in the internal documents from
virtually all the companies that you reviewed that they
tried to make that determination of a minimal dosage?
A. Yes.
Q. And they understood the pharmacological impact
nicotine had on say heart rate, blood pressure, things like
that?
A. Yes.
MR. WEBER: Objection. We have been leading
the witness.
THE COURT: Sustained. Disregard the question.
BY MR. COUGHLIN:
Q. Can you talk a little bit exactly about what happens
to the smoker? Well, tell us about what is addiction.
A. I'll give you a more complete answer and then a more
succinct answer. The complete answer, based on the
criteria developed by the 1988 Surgeon General's report, is
a is, the compulsive use of a psychoactive drug that is
reinforced by the effects of that drug.
By compulsive use, I mean it's a drug that once
one is addicted, it's extremely difficult to quit. By
psychoactive, I mean it is a drug that has effects on mood
or behavior. And by reinforcing, I mean that the behavior
is sustained by the effects of the drug.

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For example, in reinforcement, if someone likes
to drink coffee, and say I tell a patient I

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don't want you
to drink caffeinated coffee, most coffee drinkers can
switch to decaf coffee. They may have a headache for a
day or two, but they will switch, and they will still
enjoy their coffee. Most of the pleasure from the coffee
for most people will come from the coffee drinking, not
the caffeine. So, it's reinforced. It may be partly by
caffeine, but it's reinforced by the coffee.
In contrast, that would never happen with
cigarettes. If you give someone a cigarette without
nicotine, even if they have the same cigarette, the same
lighting, the same smell, all of it, they won't smoke it
without the nicotine. They will not take it. So, it's
the nicotine that is reinforcing, that's the complete
definition.
The simple definition is really loss of control
of psychoactive drug use. Once a person starts using the
drug and they want to stop, it's very difficult.
Q. Did the defendants understand how their drug
delivering device worked?
A. Yes.
Q. If we could look at Exhibit 3998, can you tell us
what this exhibit is, doctor?
A. Well, this is a document that is talking about some

of the characteristics of cigarettes and nicotine delivery
that might be important in sales, and some ideas for new
products that are nicotine based.
Q. Let's flip into the first page and see what we are
talking about. It goes through a number of items, speed,
dosage, cost in the future. If you could run through those
and tell us what those mean?
A. Well, the first one, again, restates what I said
before, that a cigarette is a drug administration system
for public use and talks about some of the advantages.
The first advantage is the speed.

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So within 10
seconds of starting to smoke, nicotine is available to the
brain. This causes this very rapid hit, and also they
contrast other drugs such as marijuana, amphetamines, and
alcohol that are very much slower. In fact, there are a
lot of those drugs that are slower.
Q. Why is that, why because people smoke marijuana, why
is that, that it might be slower?
A. With marijuana it's not the problem that it is slow
getting to the brain, it is the effect of
tetrahydracanabinol, THC, the drug in marijuana, that are
delayed. They don't occur for about 5 or 6 minutes after
they start smoking a cigarette. It's not clear it has to
do with the pharmacology, but cigarette smoking is very
rapid.

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Q. Amphetamines are uppers, right?
A. Right, but they are, they are uppers and so is
nicotine in a sense, but amphetamines are absorbed over 30
minutes. So, there is much more gradual rise of effect.
Q. And alcohol?
A. Alcohol, the same thing; is absorbed over 15, 20, 30
minutes. None of these has a characteristic of taking a
puff and getting an almost immediate drug effect. They are
all delayed.
Q. What happens in the brain?
A. Well, nicotine gets absorbed into the brain, and it
works on the brain in places that are meant for
astilcholine. Astilcholine is a hormone in the brain
responsible for transmitting information from one never
cell to another.
That's a major part of brain function. And it
works by acting on receptors which are specialized
proteins where the drug enters. It's sort of like a lock
and a key. They are meant just for astilcholine.
Astilcholine enters it and sort of turns a key
and activates a switch. And something happens. It turns

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out nicotine, works on the same receptors as astilcholine, but instead of your body releasing astilcholine, you take in nicotine to stimulate it from a drug.

When you stimulate those receptors, you have

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effects on nerve endings to release a number of hormones that affect behavior.

Q. What are those hormones?

A. Well, some of them include astilcholine itself, which can have an effect on thinking, concentration. Dopamine is one which is important in terms of feeling good, reward effects. It is something that is released by all drugs of abuse.

Serotonin is something that is released that has effects on mood depression, anxiety, in fact many anti-depressant drugs release seratonin.

We have epinephrine on crest is released, which can cause activation. Cortisol is released, which is a stress response. Endorphins are sort of like brain opiates or narcotics are released, which have effects on pain and anxiety.

The net effect is that a smoker comes to use nicotine to activate a number of different systems which can vary according to what the person needs. So, a smoker can smoke a cigarette in the morning and stimulate themselves to get going. A smoker can smoke a cigarette when they are stressed and relaxed to deal with stress. A person can have a cigarette at work when things are boring to help maintain vigilance. They can have a cigarette at night with friends to relax, and they can have a cigarette

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prior to sleep to relax.

Smokers come to use nicotine to activate these hormone systems within the brain. Many of them, one is dopamine, but there are many others. And these hormone

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5 systems really come to control mood and behavior and the
6 smoker comes to learn to cope with life by activating
7 certain hormones.
8 With nicotine, smokers smoke cigarettes all day
9 long. And where they don't have the activation system,
10 they don't feel right, in part, because over time the body
11 adapts to the effects of nicotine.
12 Q. Is that tolerance?
13 A. It builds tolerance, so then nicotine doesn't produce
14 the same level of hormone response anymore. But in
15 contrast, the brain needs nicotine to be there for a normal
16 response. And then when you don't have nicotine, you have
17 the opposite of the effects of nicotine itself.
18 So, instead of stimulated you feel lethargic,
19 you have no pep, you feel bad. You can't experience
20 pleasure very well. Instead of concentrating, you can't
21 concentrate. Instead of feeling up, you feel more
22 depressed.
23 So, when smokers don't have nicotine, their
24 brains are not functioning.
25 Q. This next, if we can bring that document back up,

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1 talked about low dosage. What does that mean?
2 A. Here they are really talking about the potency, and
3 commenting that of many of the drugs that people administer
4 to themselves, nicotine is administered in doses of one
5 milligram, which is extremely small dose.
6 Cocaine might be a hundred milligrams, alcohol
7 can be grams. And so the point here is that nicotine is
8 extremely potent. So, small amounts of it can have some
9 potential effects.
10 Q. If we can go to the next page, it talks about cost
11 and the future. Can you talk about those 2 things?
12 A. The cost issue is just very simple. Just make
13 a point. The cost of a ten minute high in the UK was about
14 9.5 US cents, that was many years ago. It's much more

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expensive now.
The future here is talking about sort of jazzed up cigarettes. They are saying that the cigarettes are basically a fast highly pharmacologically effective system; it's a legal system.
Q. What's the significance?
A. -- or a legal drug. That's very important, because most people are law abiding people. Most people don't want to use drugs that are illegal. But if you have a drug that is very effective at controlling your mood, and your well, I say, starting smoking is something that if it's not

illegal, people will soon, you know, something that is reasonable to do, it's not illegal. It's probably reasonably safe, not horrible for you, still marketed.
And then they can use it without breaking the law. And that means more people will use it. Some people will not use marijuana or cocaine because it's against the law, and they don't want to do that. But a cigarette is legal, so it makes it easier to use the drug.
Q. Further on in the document it talks about something called a turbo charge, is that --
A. Yes, this is interesting. Actually, it's not here, it's actually a few pages down, it's on.
Q. No; that was it.
A. Right. This is a very interesting analogy. They are talking about developing higher nicotine cigarettes, and they are using an analogy to cars. And they are saying, the high nicotine in a cigarette is like a V-8 turbo charged version of a German car.
In contrast to the standard model of low nicotine cigarettes, in the UK, they give examples like a Ford Ciera or Chevrolet Chevette. And then they say in the U.S, with all of the anti-pollution gear, which could be thought of as filters and things like that, this thing may only barely move. And then they go on to

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say that our
25 white rod, which is a cigarette, is apparently like any

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1 other one until it's lit.
2 And it's only when it's lit, and then they say
3 when you put your foot on the accelerator, figuratively
4 speaking, things change. And that's because you are
5 getting this charge of nicotine.
6 So, they are really analyzing the situation to
7 a V-8 turbo charged car. And that's the way the industry
8 has viewed high nicotine in cigarette smokers.
9 Q. Did the industry understand dependence?
10 A. Yes, they do.
11 Q. If we can take a look at Exhibit 2838. This is an
12 August 1979 BATCo document. And can you tell us what the
13 significance of this document is?
14 A. This document is talking about product innovation,
15 and they are coming to, they are starting out by talking
16 about the development of addiction in smokers.
17 And they start on the first page when they are
18 talking about a non-smoker. The thing that starts a
19 smoker are factors such as curiosity, the parents, image
20 and peers, so that these are non-pharmacologic factors.
21 And then they go on to the next page, and they
22 begin to say that a person begins to acknowledges the
23 pleasure from cigarettes, and then some of the benefits
24 including anxiety effects, relaxation effects,
25 concentration effects. These are pharmacologic effects of

1692
1 nicotine.
2 And third stage is dependence on the smoking
3 habits and realization of other benefits.
4 Q. Is dependence the same as addiction?
5 A. With addiction, that's the way the Surgeon General
6 viewed it. That's the way I expressed it. And I can go
7 back and forth on the same thing.
8 Q. And why is that?
9 A. Some scientific documents, such as the World Health
10 Organization have used dependence to describe

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the
11 phenomenon of loss of control of drug use. The
Surgeon
12 General, and actually the National Institute on
Drug Abuse
13 before them, thought that addiction was a good
term to use
14 because it emphasized the strength of the
compulsive use of
15 the drug, which is in many ways similar to the
strength of
16 the use of heroin and alcohol and cocaine, in
terms of
17 difficulty quitting once you start, for example.
And in
18 some of the brain processes, some of the
hormones that are
19 released, some of the other things I talked
about for
20 addiction.
21 So the Surgeon General felt that
addiction best
22 captured this strength and mechanisms of
nicotine in
23 comparison to other drugs and would be best
understood by
24 people in general. I use both terms.
25 Q. Thank you. Did the industry understand
that there

1693
1 was a minimum dose needed to maintain
dependence, the
2 habit, addiction?
3 A. Yes, they have.
4 Q. And would you take a look at Exhibit 4011.
Can you
5 tell us about this BATCo document here?
6 A. Well, this document is addressing some of
the
7 concerns of information about the hazardousness
of
8 cigarette smoking, reducing the number of
smokers. And
9 they just say in the first sentence, the number
of smokers
10 will decrease because cigarette smoking is seen
to be
11 hazardous.
12 And then they go on to say if
smokers can be
13 convinced that the hazard is not real, then the
number of
14 smokers will not decrease.
15 And then they go on and talk about
the, about
16 the goal, which is to aim to maintain or
increase the
17 smoking habit.
18 Q. Did the defendants do animal studies to
study the
19 impact of nicotine?
20 A. They have.

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Q. And I ask you to take a look at Exhibit Number 262.
And this is a 1961 document produced by BATCo. Can you
tell us what this is about?
A. Yes, this is an update on the number of projects.
Hippo and Mad Hatter were the code names for these

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projects, which were some of the earlier studies where the
question of how does nicotine maintain smoking behavior was
studied in animals.
Q. Where were these studies taking place?
A. These took place in the UK, I believe.
Q. So, not in this country?
A. That's correct.
Q. Okay. And what were Hippo and Mad Hatter products
about?
A. Well, some of the things that were looked at were
questions of release of stress hormones in the brain. It,
was known en banc back then that a lot of smokers smoke
cigarettes to deal with stress. In fact, addicted smokers,
that is, the one thing that precipitates relapse to
smoking. They can stop smoking for a while; first major
stress they have in their life, the way they know how to
cope was nicotine.
And this was a research on stress hormone
release that could play a role in smoking behavior. They
also looked at body weight. Because one of the other
reasons why some smokers smoke cigarettes is because it
reduces appetite and increasing metabolic rate, body
metabolism, and they can stay slim. These Hippo studies
showed the effects in animals and talked about that as
another potential benefit of nicotine.

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So, they were really beginning to explore what
it is about nicotine that makes people smoke cigarettes.
Q. And internally, if we could go into the first page
in. And what did they understand about nicotine and smoke?

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A. Well, this is back in '62 when they make a, make a comment that smoking is a habit based on a combination of psychological effects and physiological pleasure and has strong indications of being an addiction.

And then it goes on, makes some comparisons with other drugs.

Q. It says here, it differs in important features from addiction to other alkaloid drugs, but yet there are sufficient similarities to justify stating that smokers are nicotine addicts.

And this is from 1961; is that correct?

A. Right. That some of the other alkaloid drugs are -- morphine or heroin is an alkaloid drug. Cocaine is an alkaloid drug. Amphetamines are alkaloid drugs. And it is clear that there are big difference between nicotine and these drugs in terms of intoxication, for example.

But the similarities, there are also a lot of similarities in type of hormone release in terms of benefits of stimulation. And this is emphasizing those similarities.

Q. Did consumers in this time frame, let's take the

whole 60's, did consumers understand that nicotine or smoking could be addictive?

MR. WEBER: Let me object, lack of foundation.

THE COURT: Sustained.

BY MR. COUGHLIN:

Q. Did you find any indication that the industry was aware of what, or what the industry believed consumers were aware of?

A. The industry's own documents suggest that consumers are not aware of the effects of nicotine, and why they are smoking cigarettes. There are -- public documents certainly deny the fact that cigarettes are addictive. And their public documents have stated we add nicotine for flavor and mild psychoactive only.

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Q. Let's take a look at Exhibit 1868, an August 24, 1978 document this was produced by Brown & Williamson from Steele to McCue, August 24, 1978?
A. Yes.
Q. And can you tell us what this is about?
A. Well, this is really an illustration of the point I just made. They are talking about this is a paper to outline Steele's views on how, on consumer attitudes involving nicotine, and he just says that very few consumers are aware of the effects of nicotine, that is, its addictive nature, and that nicotine is a poison.

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I think that is absolutely true that that is not something that many people understood until recently.
Q. Okay.
Let's take a look at Exhibit 2122. This is a Philip Morris March, I think it was, 21, 1980 document from William Dunn to a Seligman. I think we saw Mr. Dunn earlier. Can you tell us what's the significance of this document?
A. Yes, this is a document from Philip Morris describing some of their internal research on nicotine, psychoactivity, in particular the research of nicotine on receptors and animal behavior and studies on nicotine analogs, which are really drugs that are not nicotine but have the same effects of nicotine.
Q. Is this the type of research that you would expect a company to do that was selling nicotine?
A. Yes. Their main product is nicotine. And I would expect that they would do research to understand what their product is doing and how it, and why people use it.
Q. And did you find that there had been any impediment to this study?
A. Well, certainly in this document, doctor, did you know -- explains why the attorneys, counsel at Philip Morris, thought that these studies were problematic.

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25 Q. Why is that?

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1 A. Well, there were two reasons. One is that, states
2 here that the oldest reason, and implicit in the legal
3 strategy employed by the years in defending corporations
4 within the industry against claims of to deceit smokers, is
5 that we in the industry are ignorant of any relationship
6 between smoking and disease.
7 So, one is they need to maintain the fact that
8 we don't know anything about this. That was Number 1.
9 Q. So that they didn't do biological work in their own
10 laboratories in this country; is that right?
11 MR. WEBER: Object to the leading nature again,
12 your Honor.
13 THE COURT: Sustained as to the form.
14 BY MR. COUGHLIN:
15 Q. And what is the second posture?
16 A. The second posture which is actually lower down on
17 the page is that any action on our part such as research on
18 the psychopharmacology of nicotine which implicitly or
19 explicitly treats nicotine as a drug could well be viewed
20 as a tacit acknowledgement that nicotine is a drug.
21 Q. What was the problem with acknowledging that nicotine
22 was a drug? Didn't everybody know that?
23 A. Well, the industry certainly knew it, and scientists,
24 I think, knew it. I don't think the public knew it. And
25 certainly the Food and Drug Administration at that time was

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1 not viewing cigarettes as drugs. They were reviewing them
2 as, you know, blended products.
3 And there are documents here that specifically
4 express concern that if we start talking about nicotine as
5 a drug, then the Food and Drug Administration may well
6 need to regulate us.
7 Q. So, what did they do with their research? If we can
8 flip over to the next page?
9 A. Well, at this stage, they continued their,

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their
10 research because Dr. Dunn felt this research was extremely
11 important for the future of their field, but that they
12 were, they, his statement is that our attorneys will
13 continue to insist on a clandestine or secret effort to
14 keep nicotine a drug in low profile. And I think that's
15 what happened.
16 Q. Is there an earlier Philip Morris document exhibit
17 754, a February 19, 1969 document from Dunn to Wakeham,
18 senior scientist that talks, if you go back into the first
19 paragraph, the highlighted paragraph there?
20 A. Yes, this, again, is the Food and Drug Administration
21 question. And this document says that we should be
22 cautious about using sort of a pharmacologic model for
23 nicotine. Do we really want to taught cigarette smoking as
24 a drug. It is a drug, of course, but there are dangerous
25 FDA implications to having such conceptualization beyond

1700
1 these walls.
2 Q. Doesn't the FDA look at all drugs and foodstuffs?
3 A. Well, it did not look at cigarettes, still doesn't
4 look at cigarettes, because cigarettes were thought to be
5 primarily a pleasure device and rather than a drug system
6 that was intended to alter body structure or function.
7 Once FDA begins regulating it, they begin
8 looking at hazards, they begin looking at doses, and FDA
9 is really set up as a health evaluation body. And the
10 last thing the tobacco industry wants is for someone to
11 start evaluating the health effects of their products and
12 how much nicotine is in them.
13 MR. WEBER: Object to that last.
14 THE COURT: Disregard the last portion of that
15 response.
16 Q. Can you tell us a little bit about pH and what pH is.
17 A. PH refers to the acid base balance. And it goes on a

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18 scale from zero to about to 12. Neutral is water, at about
19 7. Acid would be a low pH, and that's things like vinegar,
20 orange juice, lemons that are very acidic. So, they are
21 low pH.
22 Alkaline pH, or high pH things, are things like
23 backing soda, lye, soaps, and those are our alkaline and
24 have a higher pH.
25 Q. Does the pH have an impact on smoke?

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1 A. Yes, pH does have an impact on smoke, and impact on
2 the activity of nicotine within the smoke, and has effects
3 on both what the person, the smoker, feels in terms of
4 impact and also on brain waive activation which is some of
5 the central nervous system effects.
6 Q. Maybe, doctor, if you could step down to this board
7 and draw a graph that would help explain that to the jury?
8 A. I'll go back to the idea that tobacco smoke is made
9 up of particles, which are the particles that are tar and
10 nicotine, and then a gas phase or vapor phase.
11 And most nicotine is in the particles, but
12 there is also a certain amount of nicotine in the gas
13 phase, and the amount of nicotine in the gas phase depends
14 on the acid base balancing of the smoke.
15 THE COURT: Doctor, let me ask that you pretend
16 you are speaking to the court reporter, because it's
17 important for him to be able to hear, not just the jurors
18 who are closer to you. So, as much as possible, speak as
19 if you are addressing him.
20 A. Yes.
21 THE WITNESS: Yes, I will.
22 So, I would like to draw a nicotine particle,
23 and the nicotine in the gas phase and influences of high
24 pH and lower pH.
25 Okay. These are meant to be particles, this is

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1 at lower pH and higher pH. And I want to talk about these
2 two forms of nicotine. The form of nicotine

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and particles
3 which is, all these Ns is called protenated nicotine or
4 charged nicotine or nicotine that's associated with a
5 salt. That's in the particle. The nicotine that's in the
6 gas phase is unprotenated nicotine, also called free
7 nicotine or free base nicotine.
8 The higher the pH, the more free based nicotine
9 occurs in the smoke. So, there is a movement of nicotine
10 out of the particles into the free base phase. And it's
11 been shown by the industry that a higher pH is associated
12 with greater nicotine impact and greater effects of
13 nicotine on the brain.
14 And it's also known for other drugs, for
15 example cocaine, that smoking free base cocaine has a much
16 stronger effect on the body and brain than does smoking
17 cocaine itself.
18 Q. So, while you are there, can you show to us a graph
19 what happens to the nicotine that is smoked, the graph when
20 nicotine is smoked or let's say the gum or patch, what
21 happens?
22 A. This is a follow up of what I was explaining before
23 about the importance of the rate of rise of nicotine and
24 why the effects are different as a function of how fast
25 nicotine is absorbed. And what I would like to do, is draw

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1 a graph where this is the arterial blood concentration of
2 nicotine, which would be similar to concentrations that
3 might get to the brain.
4 And this is a time scale. And I'll take it out
5 to two hours. When a person smokes a cigarette, the
6 cigarette is smoked on average in about 7 minutes or 8
7 minutes. And nicotine gets to the brain very quickly.
8 And there is a big spike, so it looks like this a rapid
9 rise to a high level. And then it falls off and it drops
10 like that.

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This then, is a very rapid rise, nicotine goes into the brain, there is a big spike effect. This is cigarette smoking.

Now, people have developed other nicotine forms. There is gum, the patches for treatment, but it has been well known that these products do not give the smoker the satisfaction of smoking a cigarette. In fact, they are helpful in relieving withdrawal symptoms, but they don't by a long shot substitute for smoking and make people stop.

They are helpful, but they are not tremendously effective. And the reason is they are delivered in a different way.

For gum, you see peak level of about 30 minutes and peak concentration, that is, less than 10 percent of

that of smoking a cigarette. So, that would be gum.

The patch increases very, very slowly. It doesn't peak in the blood stream for hours, about 6 hours, and it ends up with a concentration in this range of about 20. But it doesn't get there for about 6 hours.

When a person uses a patch, even though they get reasonable levels in 6 hours, most smokers can't tell they are getting any nicotine at all because it is rising so slowly. So, again, it goes back to the fact this spike of nicotine is really one of the key elements of why cigarettes are addictive, and other nicotine products, even though people are getting nicotine, have not been a substitute for smoking.

Q. Thank you, doctor. Did the industry understand the concept of the raising the pH of smoke?

A. Yes.

Q. And did they do that to free nicotine?

A. Well, they talk a lot about the effects of pH on free nicotine. There is a lot of research that addresses the

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fact that pH increases impact and increases the effects of smoking.
Q. Let's talk, let's take a look at a '73, '74 Claude Teague document, Exhibit 1208.
A. Okay.
Q. And this is implications and activities arising from

1705

correlation of smoke pH with nicotine impact.
Do you see that?
A. Yes.
Q. And if you could flip into the first page, could you tell us what this document is about?
A. Yes, this is a sort of a competitive marketing analysis by R. J. Reynolds, trying to address the question of why is the Marlboro cigarette doing so much better than a Winston, even though the nicotine deliveries are the same by machine, by smoking machine, and why Kool is doing so much better than I think it was Newport or Salem -- than Salem.
And their analysis of this is that when they looked at the pH of Marlboro, Marlboro smoke, its pH was much higher than the pH of Winston. And same was true for the comparison of Kool and Salem. And they reasoned that people are liking to smoke Marlboros because the pH is higher, there is more free nicotine, and they are getting a better nicotine effect from the cigarette.
Q. Let's flip over to the second page. And if we take a look, it says, smoke pH and free nicotine in those top 3 paragraphs, if we could.
And what does that talk about?
A. The first paragraph really states what I said, which is that sort of at a normal smoked pH at or below 6,

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essentially all the smoked nicotine is combined with acid substances and is not volatile, which means it is part of the particle and is slowly absorbed by the smoker.
And when pH increases above about 6,

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there is
an increasing proportion occurs in the free form which is
volatile and states here, is rapidly absorbed, believed to
be instantly perceived as a nicotine kick.
Q. And it talks on the bottom paragraph as a result of
the higher smoke pH, the current Marlboro despite a
two-thirds reduction in nicotine over the years,
essentially has the same amount as free nicotine.
What does that mean.
A. Well, the nicotine and tar ranges of cigarettes by
machine testing have showed reductions in nicotine and tar
levels from about the 1950's, mid-1950's on.
This was in response to public pressure,
government pressure to try to make cigarettes less
hazardous. And what this comment says is even though the
nicotine level has dropped by two-thirds, the impact of a
nicotine that was smoked was compensated for by increasing
the pH and that there are actually charts here which show
the effect of pH on the amount of free nicotine in the
cigarette when smoked.
Q. Okay. We'll take a look at that on the last
paragraph on this page, where it starts in addition?

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A. Right, now here they are start talking about some of
the ways in which you can change pH. And one thing that's
talked about here is adding ammonia to the blend.
Q. And what does that do to nicotine?
A. Well, according to these documents, ammonia will,
one, it increases the efficiency of transfer from nicotine
from the tobacco to the smoke.
And two, it makes the tobacco smoke more
outlined or you know, higher pH. That's what all these
documents suggest occurs.
Q. Do you know who Kathy Ellis is?
A. Yes, Kathy Ellis is Philip Morris's Vice President
for I think world wide affairs or something like that.
Q. And did you have a discussion with her

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about pH and
smoke and additions of ammonia?
A. Yes, I was contacted by Dr. Ellis following a
deposition that I gave in the tobacco case put on by the
State of Washington Attorney General.
Q. And --
A. And in that we were talking about what was the state
of the evidence that pH resulted in faster absorption of
nicotine in humans.
And I said, no one has ever looked at that
question in humans because the cigarettes with different
pH's are not available.

1708
Q. And did she offer to give you cigarettes with the
same pH's?
A. Well, the next day or day after I got a call from Dr.
Ellis and said I heard you would like some cigarettes. And
so I said, yes, I'm interested in this question of does pH
influence the rate of absorption. And I'm interested in
doing human studies to test that, but I need cigarettes
that are similar except differences in pH.
So, she offered to make cigarettes with
different amounts of ammonia, which I had assumed, based
on all the documents that I read, would mean a higher pH.
Q. And what happened?
A. Well, she sent back reports which said, well, we
added ammonia and guess what, it doesn't change pH.
Well, I don't understand that. First of all,
it's not useful to me as a scientist at all because the
issue is pH in terms of rate of absorption.
And two, I don't understand why all of the
industry documents say when you add ammonia it increases
pH, and yet when she added ammonia for her cigarettes, it
didn't.
And also cigarette manufacturing is very
complicated, and there are a lot of ways to alter pH
besides ammonia. So, I could not use those cigarettes,

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25 and it really was not helpful.

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1 Q. So, it didn't change your opinion at all on this
2 topic?
3 A. No. The documents basically say that adding ammonia
4 increases pH. And why Dr. Ellis' adding ammonia didn't do
5 that, I have no idea.
6 Q. Does that make sense from a scientific standpoint
7 that adding ammonia would free up nicotine does that make
8 sense?
9 A. Yes, it's explained, well, in these documents why
10 that should be the case. And again, why the Philip Morris
11 cigarette they made for me did not do that, I do not know.
12 Q. If we could go to the graphs. Can you tell us what
13 this graph is about, doctor?
14 A. Well, this graph is one that looks at the pH of the
15 smoke. So it's the acid base balance. And the scale goes
16 from 5 to 7, with, and looks at pH puff by puff.
17 The bottom one is the Winston, which shows that
18 the pH is substantially lower. Here the pH average is
19 probably 5.8 or 5.9. And Marlboro the pH is higher,
20 probably 4.6 or 4.5.
21 Q. In the early 70's when RJR are looking at their
22 Marlboro cigarette of Philip Morris, right?
23 A. Yes.
24 Q. And if we look at the next charts?
25 A. This next chart shows the data on machine delivered

1710

1 yields from 1955 through 1973, for Marlboro and Winston on
2 the top, the top panel.
3 Q. And what's the significance of this?
4 A. Well, at the top panel is tar bottom panel is
5 nicotine.
6 What this shows is that for most of the time,
7 and certainly from 1961 on, that the nicotine that's
8 measured by the smoking machine, total nicotine was
9 exactly the same for Marlboro and Winston so that the
10 rating number would be exactly the same. And it would be

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about 1.3 milligrams or 1.4 milligrams. They would have the same rating by machine.

Q. And yet the pH ratings were different?

A. Yes.

Q. And when you say the cigarette rating machine, what are you referring to?

A. Well, cigarettes are rated by a standard test that was developed by the Federal Trade Commission. The way this test works is a cigarette is placed into a machine and connected to a syringe basically. And the cigarette is lit and the syringe draws out 35 cc's or milliliters of smoke, which is about an ounce of smoke over exactly two seconds, repeats that every 60 seconds, until the cigarette is burned down to a certain distance above the filter over wrap. So, every cigarette is smoked that way.

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Now, that's not how people smoke cigarettes, but that's the standard machine testing way. And so this graph shows that when you smoke these cigarettes by the standard machine test, they have exactly the same nicotine delivery.

Q. And is there one more chart?

A. Yes.

Q. And what's this chart show?

A. Well, this chart is a little bit complicated because of different things on the chart, and can I point them out, you think.

Q. Certainly, you can just lean over and point right there?

A. Well, the top most one really is just the -- is sales. That's the problem that R. J. Reynolds saw that Marlboro was selling much more sales than Winston.

This line here, these lines show that pH's of actually, this is -- yeah, show the pH's of Marlboro and Winston between 1964 and 1973, showing that the pH's of Marlboro at one time were similar to Winstons. But now they are much higher.

The bottom graph here shows free

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nicotine in a
smoke. So, they have gone through and calculated the
effect of pH on free nicotine. And you can see that in
the 70's the free nicotine which has much more activity

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than total nicotine is more than twice as high in the
Marlboro than the Winston. So, even though the machine
testing gives them the same nicotine value, the free
nicotine is more than twice as high in the Marlboro.
Q. And did RJR catch up to Philip Morris?
A. Yes, eventually the pH's became similar. They
started doing things to cigarettes, adding ammonia and
other things, and pH's became similar.
Q. Let's take a look at Exhibit 1935-A. We skipped a
document on you.
A. Yes.
Q. Okay. Can you tell us what this document is?
A. Well, this is an RJR document. It just talks about
the question of adding ammonia to their sheet tobacco which
has to do with a reconstituted tobacco which is a big part
of cigarettes and just states that Philip Morris began to
add ammonia to their sheet in 1965, and increased the use
of this tobacco quite a lot between '65 and '74, and that
this corresponds to the time period of dramatic increases
in sales Philip Morris made.
And then it says that RJR introduced ammoniated
sheet material in the Camel in 1974 and then saw a better
market performance in subsequent years.
Q. Now, subsequent to this or around this time, isn't it
true that Philip Morris's pH was actually coming down?

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A. Yes.
Q. And RJR's was apparently rising?
A. Rising, I actually don't have those numbers. I can't
tell you exactly what the change was.
Q. Okay. Let's take a look at the next in line, Exhibit
2193. This is September 8, 1980 document from

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to Dr. Lloyd Morris at RJR. And if we could flip into the first page, and if we could take a look at the highlighted portion?
A. Right, this is further commentary on the issue that I just mentioned. RJR is showing graphs indicating that RJR has caught up with Philip Morris in terms of nicotine technology, and also saying that their approach has been one that combines controlling smoke parameters by blend formulation and removing nicotine, rather than adding or transferring nicotine.
It has to do with some of the ways that I talked about before, of taking different kinds of tobacco and then extracting it or adding it to maintain the desired levels of nicotine.
Q. Was Philip Morris and RJR the only U.S. companies experimenting with ammonia?
A. No, other companies were as well.
Q. And could you take a look at Exhibit 3318. This is a Brown & Williamson May 18th, 1989 Research and Development

document. And if we, if we flip into this document to the summary of the programs, executive summary, if we could blow that portion up.
Can you tell us about what this B and W says?
A. Well, this document, the first refers to a conference that was conducted to discuss the importance and use of ammonia technology in making cigarettes. And it, they talk about knowledge gaps, about areas of possible collaboration, and note that all U.S. manufacturers except Liggett use ammoniated tobacco on some of their cigarette products.
Q. And does it talk about whether B and W has been successful in developing ammonia technology?
A. Yes, it says that they have, in the reconstituted tobacco product they have used it.
Q. And did any companies, did RJR specifically think

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about this technology in reference to the, to a new brand,
the youth appeal brand?
A. Yes, they have.
Q. Okay. If we could take a look at Exhibit 1223,
December 4th, 1973 document from Frank Colby be to
Mr. R. A. Blevins, B-L-E-V-I-N-S, Jr. And if we could blow
up that first portion, can you tell us what this is about?
A. Yes. Here the idea is that youth might like
cigarettes with more nicotine kick, and so we are talking

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about going back to the technology of the cigarettes of the
'50's. And their comment, which is really at the bottom of
the page, for how they could do it, is that we could make a
cigarette level with a tar level that's comparable to Pall
Mall, with an old style filter, but not adding extra
nicotine, but getting additional nicotine kick through pH
regulation.
So, their concept was, if they had a higher pH
cigarette they could get a greater kick for their youth
cigarette without increasing the total nicotine yield,
which was something they were trying not to do.
Q. I want to switch topics for a second and talk about
compensation. Can you tell us what compensation is?
A. Okay. To talk about compensation, let me go back
again and talk about the issue of people smoking for
nicotine.
As I said before, people smoke to get some of
the effects of nicotine on brain hormones to modulate mood
performance, pleasure, et cetera. They also smoke
cigarettes because when they don't have a cigarette, after
a certain period of time they feel uncomfortable, they
can't concentrate they feel lethargic, they have
withdrawal symptoms.
The net results of trying to both get the mood
control, pleasure control, stimulus control,

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and avoiding

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withdrawal symptoms is smokers to regulate the amounts of nicotine they take in. They take in similar amounts of nicotine from their cigarettes day-to-day.

Compensation addresses the question of what happens when a person who has a certain need for nicotine is faced with a cigarette that's got a different yield.

Q. Could we take a look at your Demonstrative Exhibit 136 PDEM?

A. Yes, here is a summary of some of the points that I was just making. We can think about people using nicotine both for some primary effects and to prevent withdrawal effects. And some of the primary effects were for pleasure, arousal, improving task performance, relief of anxieties, hunger, body weight reductions, those are some of the reasons someone might want to take nicotine for positive affects.

And the negative effects from withdrawal are irritability, restlessness, drowsiness, difficulty concentrating, impaired task performance, anxiety, hunger, weight gain, sleep disturbance, cravings or strong urge for nicotine.

So, it's a combination of these things that accounts for people taking in similar amounts of nicotine day for day.

Q. Did you prepare a video about tipping what we call

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ventilation?

A. Yes, the issue has to do with when the tobacco companies have said they have lowered nicotine and tar yields, what does that mean? How do they do that? And there are several ways to do that.

One way is shown on the video, but in summary. First, I would just say that one way obviously is filters; they have added filters, and that's been

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effective.
One way is that since the smoking machine takes a puff every 60 seconds, if you do something that makes the cigarette burn faster, faster burning paper, then the cigarette machine takes fewer puffs on the cigarette, machine cigarette, before it's burned down.
The problem for a smoker, the Surgeon General machine takes a puff every 60 seconds, and a smoker can take it every 30 seconds or more if they want to.
Q. Let's talk about that for a second. The industry knew the cigarette smoking machine didn't mimic the smoker; is that right?
A. They did know that.
Q. Now, the FTC also knew that; isn't that right?
A. The FTC knew that also, right.
Q. And in fact the FTC told the cigarette industry, right?
A. Sort of when the FTC method was first developed, the

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industry said this machine is not going to smoke the same way as the smoker, as an average smoker, which was sort of logical because of a very fixed parameters.
I'm not aware, however, that the industry told the FTC that later on when they had data comparing cigarettes that are higher and lower yield. In fact, smokers' exposure was the same. I don't think they ever told the FTC that.
Scientists published that, including some of my own work, but I'm not aware any time that the industry told the FTC these are data. Take a look at them. They show low yield cigarettes, not low yield.
Q. Are you aware at any time that the industry told the customers that?
MR. WEBER: Objection.
THE COURT: Sustained.
BY MR. COUGHLIN:
Q. Can you describe -- let me hand you --
A. Just --
Q. Go ahead.
A. Let me say, I was, I'm talking about low

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yield
22 cigarettes. There is a third point I wanted to make.
23 Q. Go ahead?
24 A. The third way of doing it is explained in part on the
25 video. And that's by using ventilation systems in

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1 cigarettes. Ventilation systems are basically putting in
2 holes in the filter so that when a person sucks on a
3 cigarette, say if there are no holes in the filter, you
4 suck on the cigarette, you draw the smoke through to back
5 on the right, and there is some fresh air coming in through
6 the paper. But if there are ventilation holes and you suck
7 in at the tip, then you draw in a lot of fresh air that
8 dilutes the smoke. And that can dilute the smoke up to 90
9 percent. And so that accounts for very low yields.
10 The problem with that is that the holes are
11 placed in a place on the filter, that it can be easily
12 blocked by the smoker. It's hard to see them, but the
13 smoker just learns if I hold the cigarette in a certain
14 way, the draw characteristics are better, the taste is
15 better; or if I put my lips on the cigarette in a certain
16 place, the draw characteristics and taste are better.
17 So, smokers learn to block these holes and
18 therefore get -- they really defeat the ventilation system
19 and get very much higher yields. And the ventilation
20 system is actually shown on that video.
21 Q. Let's see the video. Can you explain what's going on
22 here?
23 A. Well, there is the tobacco rod sort of on the right
24 hand side and filter on the lip. And the tipping paper is
25 a piece of paper that goes over the sort of junction

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1 between the filter and tobacco rod. And you will see there
2 is a laser beam coming down which is making

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holes in this
paper. And those holes are the ventilation holes. And those holes will allow fresh air to come in when the cigarette is puffed from the end.
Q. Now, is there a good reason, from a design standpoint though, that those holes are where they are located?
A. There are reasons why, if you, if you place it too far up, then it makes it difficult to draw the cigarette. You have to suck harder. So, there are some technical reasons for it.
I would say, though, that these holes, which are really critical part of the loyal cigarette, are never explained to the consumer, and they were very hard to see. If the consumer were to use these cigarettes properly, they have to know that the hole is there and to be explained not to block them.
And that would be easy to do. You could just put a marker on a cigarette, a band of color, that says the holes are here, if you want this to be a low yield cigarette like we advertise in our advertisements, don't block these holes.
But I've never seen that; that has ever been explained.
MR. WEBER: I'm going to object on the extent

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the advertising is post '69, what should be warned about.
THE COURT: I'll sustain, disregard the last portion of that.
BY MR. COUGHLIN:
Q. Have you ever seen any statements by the industry, any public statements, informing consumers on how to smoke those cigarettes?
MR. WEBER: Same objection, post '69, no objection to the time period before.
THE COURT: You can only consider his answer with regard to after 1969.
MR. WEBER: Before '69.
THE COURT: You can only consider it

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with
14 regard to before 1969. After 1969 there are certain
15 warnings on cigarettes and those are controlling on the
16 issues. So, don't consider his response for whether or
17 not they failed to disclose it after 1969.
18 MR. COUGHLIN: Your Honor, may we approach on
19 that?
20 THE COURT: Yeah.
21 (The following discussion was conducted at the
22 side bar between court and counsel, out of the hearing of
23 the jurors, as follows:)
24 MR. COUGHLIN: Your Honor, I don't think this
25 is covered at all by the warnings.

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1 First of all, there is no prohibition on the
2 tobacco industry when they are advertising. There is no
3 prohibition on the tobacco industry when they are
4 advertising about what they can inform consumers as to
5 these low tar cigarettes that they are putting out. It's
6 not covered by the warnings. We are not talking about
7 what they have to do for disease or anything else. And
8 just as we saw --
9 THE COURT: His response was broad enough to
10 allow the jury to consider that that should be a warning
11 contained on the cigarette pack. And because Congress has
12 determined what warnings will be put on the cigarette pack
13 should be, I think they are preempted.
14 MR. COUGHLIN: Which, can I ask him anything
15 about any statements aside from warnings on the cigarette
16 packs that he is aware of that the industry has given
17 along these lines? It's an important issue.
18 THE COURT: You are saying they were giving
19 warnings someplace else?
20 MR. COUGHLIN: I'm saying they have not, and
21 consumers are unaware of the impact of what is happening,
22 and the industry is advertising in such a way which I will
23 link up with somebody else that essentially --

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24 THE COURT: Do you have a response?
25 MR. WEBER: My position on that it is directly

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1 covered by the Allgood, a Fifth Circuit decision that says
2 if the essence of the claim is that there is a
3 non-disclosure of smoking and health, it's preempted the
4 same as if it were a direct attack on the claim on the
5 warning. Allgood is very clear of that.
6 So, even if he says is there some other way
7 other than the issue, Congress also has adequately warned
8 people before '69.
9 THE COURT: Stay away from that, and we'll take
10 a break shortly, and I'll take a look at it over the
11 break.
12 (The following proceedings were conducted in
13 open court.)
14 BY MR. COUGHLIN:
15 Q. Was the tobacco industry aware of the compensation
16 issue?
17 A. Yes, they were.
18 Q. If we take a look at Exhibit 1080-A?
19 MR. WEBER: 80-A or 88.
20 MR. COUGHLIN: 80-A.
21 Q. And can you tell us, this is an RJR confidential memo
22 March 28, 1972 with Dr. Senkus' name on it; do you see
23 that?
24 A. Yes.
25 Q. Okay.

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1 MR. COUGHLIN: And if I could have the elmo.
2 Q. Inside that document it talks about discussions and
3 recommendations, if you flip inside that document. And can
4 you tell us --
5 A. Yes.
6 Q. And can you tell us what they are talking about here?
7 You might be able to see it better on the TV actually?
8 A. Yes, they are just restating what I just tried to
9 explain to you. He says, in theory and probably in fact,
10 the given smoker on a given day has a rather fixed per hour
11 and per day requirement for nicotine.
12 Given a cigarette that delivers less

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nicotine
13 than he desires, the smoker will subconsciously adjust his
14 puff volume and smoking frequency so as to obtain and
15 maintain per hour and per day requirements for nicotine.
16 And then it says, despite the philosophy of
17 critics, there will be no virtue or logic for reducing the
18 nicotine level than that desired by the smoker.
19 Q. And did they talk about, on the next page, about how,
20 what the smoker bases his compensation on?
21 A. Right. Then he goes on to say that, if the smoker is
22 basing his consumption on nicotine, then a present low tar,
23 low nicotine cigarette offers zero advantage to the smoker
24 over a regular filter cigarette, but simply cost him more
25 and exposes him to substantially increased amounts of

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1 allegedly harmful gas phase components in obtaining his
2 desired daily amount of nicotine.
3 So, this is really a very direct expression of
4 the compensation idea that people will smoke cigarettes to
5 get the nicotine they want.
6 Q. And did you take a look at whether Philip Morris also
7 understood that?
8 A. Yes.
9 Q. If you take a look at the September 17th, 1975
10 document from Goodman to Myer?
11 A. Yes.
12 Q. Can you tell us what the significance of that
13 document is?
14 A. Well, this was a study --
15 MR. WEBER: Can we have an Exhibit Number on
16 that's.
17 MR. COUGHLIN: I'm sorry, 1439.
18 A. Shall I start.
19 Q. Yes, please.
20 A. This is a study where Philip Morris wanted to know
21 how many of our smokers actually have been exposed to
22 smoking Marlboro full flavor and Marlboro lights.
23 The way it was done is that they were able to
24 measure the number of puffs, how fast it was puffed, how

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long the puffs were, and then to use that to sort of

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program the smoking machine to smoke like the smokers
actually smoke their cigarettes.
And what they showed was that smokers of
Marlboro full flavor and Marlboro lights, despite
substantial differences in FTC ratings, resulted in
exactly the same exposure of nicotine and tar for the
smokers. So, there was no difference in smoking the
Marlboro light or the Marlboro.
Q. And is that the conclusion in that document?
A. Yes, basically it says the smoker data in the study
are in agreement with the results found in other project
studies. And then it talks about larger puffs. And then
on the next page it says in effect, the Marlboro 85 smokers
in this study did not achieve any reduction in smoke intake
by smoking a cigarette, the Marlboro Lights, normally
considered lower in delivery.
Q. What's the concept of mutagenicity?
A. That's something that deals with the cancer causing
potential of tobacco smoke. The idea is that cancer
develops when chemicals in tobacco smoke react with DNA,
genetic material, to damage the DNA. And then when cells
in the body with damaged DNA reproduce themselves, or grow,
which cells normally do, the products of that division are
mutated.
And there are tests looking at bacteria where

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you can look at the mutation potential of a given
chemical. This can be done in the urine of smokers and we
have done this in our studies showing that people smoking
low yield cigarettes and high yield cigarettes have the
same mutagenic activity in the urine, even though the
cigarettes of tar is very different.
It can also be done in the tar

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itself, from low
yield cigarettes to high yield cigarettes, to look at the
amount of mutagenic activity or potential cancer causing
activity in the tar.
Q. Did the cigarette industry take a look at this?
A. Yes.
MR. WEBER: I object. There was no reference
on the subject of mutagenicity in Dr. Bentowitz's report.
I didn't object to that at first.
MR. COUGHLIN: I think it's covered by
compensation, your Honor; high and low yields.
MR. WEBER: Mutagenicity is a subject separate
from high and low yields, it is a whole separate area of
testing.
MR. COUGHLIN: Yes, it is.
THE COURT: Ask another question, and we'll
deal with it in the context of a specific question.
MR. COUGHLIN: Okay.
Q. If you take, if you take a look at Exhibit 2516.

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If I could have it on the elmo. If we take a
look at Exhibit 2516, the RJR document 2/25/83 from Chris
Lee to Dr. Rodgman, and it talks about low tar smoke. Is
low tar smoke safer; do you see that?
A. Yes.
Q. You probably will be able to read it easier on the
TV. It's in handwriting. Either way, can you tell us what
exactly is going on here?
MR. WEBER: We object to that, your Honor.
This is mutagenicity testing.
THE COURT: I think it's more relevant to the
issue of compensation, so, I'll allow it. I think the
general direction of the quote that's been put on the
board deals with compensation. And the question as to
whether low tar and nicotine cigarettes were safer, I
think those are within the balance of the doctor's report.
BY MR. COUGHLIN:
Q. And what did RJR conclude?
A. Well, they basically stated that it's hard

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to know if
low tar smoke is safer. One of the ways to test that is to
look at mutagenic activity of the tar that gets generated.
And this document says that in our own
experience that the mutation rate was higher with the
smoke from lower yield cigarettes than higher yield
cigarettes, from the tar in those cigarettes.

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So, this would suggest that low yield
cigarettes were not safer with respect to the nature of
the tar, actually more hazardous.
MR. COUGHLIN: Your Honor, if we could take a
break now, I think that I have to, in light of the court's
ruling, move some stuff around. And I'll be done about 10
minutes after the break.
THE COURT: Well, you'll need to be done at the
end of the break. We'll take about 12 minutes. At about
well, five minutes after be back in the jury room.
Throughout this time frame don't talk about the case among
yourselves or with anyone else. Don't form any opinions
or express any.
(Brief Recess.)
THE COURT: Mr. Coughlin.
MR. COUGHLIN: Thank you, your Honor.
BY MR. COUGHLIN:
Q. Dr. Benowitz, did Philip Morris do central nervous
system research?
A. Involving nicotine, yes.
Q. Can you tell us about that?
A. Well, some of the most important work was done by Dr.
Victor DeNoble in 19 -- late 70's, early 80's. And he did
a series of studies, which I think are extremely important.
He was looking at animal models for why people smoke

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cigarettes, and he was looking at what's called
self-administration of drugs. These are test systems where
you teach an animal how to do something, like press a bar
to get drugs or substances, and you see how hard

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an animal
is willing to work to get a substance or drug, whether they will do it, and if so, how hard they will work to do it. And he was an expert in doing that kind of research.

And he did a series of studies that were really quite interesting. First, he was one of the first people to show that animals would self-administer nicotine. Prior to that there had been a lot of controversy about whether animals would do this.

And this test is important because this is a test that behavioral pharmacologists use a lot to screen on the abuse ability of a drug. An animal will self-administer, there is concern that a human might abuse it.

The second study he did involved acid aldehyde, which is a chemical in tobacco smoke. It's also one of the major breakdown products of alcohol in the body, and is believed to have some activity on some alcohol like activity, perhaps. And he showed that animals would self-administer acid aldehyde.

And the third study he did, maybe even more interesting, is that he showed that when he gave the

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combination of nicotine with acid aldehyde, that the animals self-administered it much more, more than even could be predicted by the sum of the other.

So, it's like nicotine and acid aldehyde had a super effect when combined, so the effect was more than the sum of the two. I think that has important implications for understanding why people smoke cigarettes and was also never made public to my knowledge, any of the acid aldehyde work until I saw the documents from Philip Morris.

Q. And that was in 1981?

A. The studies were done or finished up around 1981.

Q. And when did you work on the Surgeon General's report

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on nicotine?
A. 1988.
Q. And you didn't have the benefit of these studies that were done in the early 80s?
A. No.
Q. And did, are those studies the results of those studies contained in Exhibit 2326?
A. Yes.
Q. Did somebody review those studies in 1983 without mentioning any names?
A. Yes. The studies were reviewed by lawyers for Philip Morris.

1732

Q. Okay. And I'll ask you to turn into Exhibit 2576. And can you tell us some of the conclusions that were reached by the lawyers working for Philip Morris on these studies?

MR. LERMAN: Your Honor, just for the record, we want to interpose an objection to the document on the grounds the judge, you have already read ruled on this.

THE COURT: I'm sorry; I didn't hear the last portion.

MR. LERMAN: I wanted to state the privilege objection for the record, your Honor.

THE COURT: And I'll overrule that objection.

BY MR. COUGHLIN:

Q. And a review of these studies revealed what, doctor?
A. There were comments from attorneys objecting to the fact that Philip Morris was doing some of these studies and they explained why for several of the studies.

For example, on the first page they are talking about results that were not published, trying to identify where in the brain nicotine was working as a reinforcer to smoking. And they were actually, the scientists were able to identify areas where nicotine seemed to be working.

And on the next page the response from the lawyers is that a troublesome aspect of this report, as is typical of all the papers in this packet, is that nicotine

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is treated as a drug and a drug affecting the central nervous system. Then it goes on to say the fact that Philip Morris is even engaged in such research may be taken as indicating a particular view of the importance of nicotine in cigarette smoking.

Q. Did it go on to discuss some of other studies?

A. Yes, study II was one that worked at the development of behavioral tolerants to effects of nicotine with repeated doses.

Q. What's the effect of tolerance?

A. Tolerances means when you are exposed to the same drug, the same amount of it all the time, over time, It has less effect of the given drug over time. This is indicative of drugs that are abused over time, very addictive drugs, this was done in the laboratory.

And then on page 3, the lawyer said it is obvious that such a report has undesirable implications for smoking and health litigation. Tolerance is frequently cited as one of the hallmarks of addiction. It is the industry's position that one of the classical criteria for addiction is tolerance, and that such has not been demonstrated in case of nicotine.

And it goes on to talk about the implications of the findings in this laboratory in fact showing tolerance.

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Q. Does it go on and talk about another study on page 6?

A. Yes, on the fourth study they talk about, again involves central nervous system effects, studying action of nicotine on behavior. And the lawyers again say the emphasis on this study on central nervous system pharmacologic actions is clearly at variance with positions the industry takes with regard to nicotine and smoking.

Q. Is there anything else of significance in

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that
document to you?
A. Yes, actually there is a summary on page, on the
bottom of page 7 and at the beginning of page 8.
Q. And we don't have that on the screen?
A. No.
Q. If you could just tell us what that is?
A. Well, this states that the overall results of this
research are extremely unfavorable. It says that few
people accept the showing that reinforcement capacities of
a drug are sufficient to label that drug as addictive.
However, many people do use that as a primary criterion for
assessing abuse liability of a drug.
And they go on to say that some people accept
reinforcement capacity again talking the study that rats
self-administer nicotine is one of the several criteria
for an addictive drug. This research strengthens the
adverse case against nicotine as an addictive drug. And

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it also goes on and says the addiction view of cigarette
smoking posits that cigarette smoking is influenced by
circulating levels of nicotine in the blood. DeNoble,
present DeNoble research is consistent with this decision,
since the reinforcing actions of nicotine were influenced
by experimental manipulation of blood nicotine levels.
So, here very important research was judged to
be extremely adverse to Philip Morris's position about
addiction.
Q. Did you have this research available to you in 1988?
A. No.
Q. I ask you to take a look at Exhibit 3213?
A. Yes.
Q. This is a Tobacco Institute, 1988 release. Is that
about the time, May 16, 1988, is that about the time of the
release of the Surgeon General's report on addiction?
A. Yes.
Q. And it says claims that cigarettes are addictive
contradicts common sense; is that right?

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A. Yes.
Q. And that was what the industry said in response to your report?
A. Yes.
Q. And exactly it says here on the bottom, the claims that smokers are addicted defy common sense and contradict

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the fact that people quit smoking every day; do you see that?
A. Yes.
Q. Did the fact that people quit, does that make something non-addictive?
A. No, people quit all addictions, and studies comparing addictions actually show comparable quit rates. And in fact there is important variation among smokers, it's stated here that 40 million Americans are former smokers, and 95 percent of smokers quit without help. Well, that is correct. However, for most of these smokers it was not easy. On average it took four or five quit attempts. On average it took many years. In many cases people quit only when they were told that they had some health injury. So, this is misleading in terms of how easy it is to quit smoking.
Now, it is true that there are differences among smokers. Some fortunate smokers can quit smoking without much disruption of their life. And those people are lucky.
Some smokers, no matter what they do, can never quit. Or don't seem to be able to quit unless you put them in jail and take the cigarettes away from them. Those people are not fortunate.
Most of the others are in-between. They can

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quit, but it's difficult, and it takes a lot of work and lot of and often many years.
We understand actually there are genetic reasons for some of this. The full explanation

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is not
available, but we are beginning to understand that people
are different, smoke for different reasons, and some
people are susceptible to becoming much more highly
addicted than others. But the vast majority of people are
addicted and have a great difficulty quitting.
MR. COUGHLIN: Thank you, doctor; no further
questions.
THE COURT: Cross examination.
MR. WEBER: Your Honor, if you give me a few
seconds I have to get some papers moved over.
CROSS EXAMINATION
BY MR. WEBER:
Q. Thank you, your Honor. Good morning, Dr. Benowitz?
A. Good morning.
Q. My name is Bob Weber. We haven't met. I represent
R. J. Reynolds Tobacco Company. I'm going to ask you some
questions in general about your testimony and some of the
issues you raise regarding RJR Reynolds. And some of the
other lawyers will have questions about their own clients,
all right, sir?
A. Yes.

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Q. Good morning, ladies and gentlemen. Let me just
touch on a few issues you mentioned first before I get into
them in detail.
At one point you mentioned something about the
percentage of people who try to quit, who may quit for a
while and then relapse, correct?
A. Yes.
Q. And you also talk about the number of people who are
smokers who were surveyed and say they wish they could
quit, right?
A. Yes.
Q. In both those issues the number of people who were
surveyed who said they would wish they could do it and the
number of at issue who try to quit and have at least some
period of failure, those statistics are close; are they
not, sir -- with respect to people who try to diet and lose

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weight?
A. I don't know offhand the numbers for dieting and losing weight.
Q. You do know that the diet relapse rates are equal to or greater to the relapse rates for smoking cessation. You testified to that?
A. I would suspect that's true. I don't know that for certain, but from my experience, I suspect that's true.
Q. Just in the ballpark?

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A. Yes.
Q. You are familiar with the fact that most people are overweight, you ask them, they say they want to lose weight, right?
A. Yes.
Q. And they don't?
A. Yes.
Q. And that's just evidence there are a lot of things we do in our lives, a lot of choices we make where we may wish to do one thing, and we just don't carry it out. That's true. That's part of human nature, right?
A. Well, some things. I think weight is a particularly good example of that, because being of low body weight is important in our culture. But I must say that food is something that people need to have. No one ever needs to have nicotine.
Q. People don't need to have red meat though, right?
A. That's correct.
Q. And indeed, you have got a cardiology, practice, correct?
A. Yes.
Q. And when someone has a heart attack or may come to you or the cardiologist you practice with, you tell them to change their diet, correct?
A. Yes.

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Q. And you tell them to stay away from certain kinds of foods and saturated fats?
A. Yes.
Q. And some of them can't -- strike can't. Some of them won't do that, right?

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A. Some of them don't do it.
Q. Fair enough.
Now, again, I want to delve into this ammonia issue in detail later. I just want to touch on a general issue. You said you saw some documents that ammonia raised pH in cigarettes, right?
A. Yes.
Q. And you showed to the jury no document, did you, sir, that showed that ammonia actually did raise pH over a period of time in commercial cigarettes?
A. No, the documents that I saw stated that in words, but I never saw data.
Q. And you are not stating from that stand today, are you, sir, that ammonia used in commercial cigarettes was used in amounts sufficient enough to actually have a material effect on smoke pH?
A. The only thing I'm stating is what the documents stated. I have no personal research experience with adding ammonia in making cigarettes.
Q. And you don't know how much ammonia would need to be

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added to affect pH?
A. That's correct.
Q. You do know from the documents you have reviewed that there are other reasons that relate to the use of ammonia in cigarette processing, correct?
A. Yes.
Q. One of those reasons is that ammonia improves smoke quality, right?
A. Yes.
Q. And that's particularly true with respect to reconstituted tobacco which has poor smoking quality, correct?
A. Yes.
Q. Reconstituted tobacco, as you know, reduces tar and nicotine as compared to natural leaf, correct?
A. Well --
Q. On FTC testing?
A. On tar it does. Nicotine depends because of the control of nicotine. They can do it either way.
Q. Let me ask this, when I talk about reducing tar and nicotine, let's assume I'm talking FTC test

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methodology?
A. Yes.
Q. On the FTC test methodology did they find that reconstituted tobacco reduced tar and nicotine compared to the natural leaf?

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A. Yes, you could use recon actually to increase nicotine. That was talked in some documents. But I think in general, what you are saying is correct.
Q. And the recon has never been used in commercial cigarettes to increase the amount of nicotine, the amount, has it?
A. I don't know one way or the other.
Q. You are certainly not making that claim as part of your testimony?
A. That's correct.
Q. Now, with respect to the role of ammonia on smoking quality, you know that ammonia reacts with sugars and tobacco, correct?
A. Yes.
Q. And there is a special binding of the ammonia, reaction of the ammonias and sugars, and it releases certain flavorful components, doesn't it?
A. Yes.
Q. And components with names like pyrazines and pyridines, correct?
A. Yes.
Q. And that improves the overall taste sensation for the smoker?
A. Yes.
Q. You made one other point, and my last general quick

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point, you made one other point on the issue of faster burning paper?
A. Yes.
Q. And said that burns faster and in-between the time that the machine took the puffs?
A. Yes.
Q. And that would work for a real smoker too, if a smoker puts it down in the ashtray it is going to burn faster; the same way as when the machine's not puffing, right?

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11 A. Yes.
12 Q. Now, Dr. Benowitz, you are personally familiar with a
13 number of the scientists at the R.J. Reynolds Research
14 Laboratories, aren't you?
15 A. Yes.
16 Q. You know Dr. Townsend?
17 A. Yes.
18 Q. You know Dr. DeBattisti?
19 A. Yes.
20 Q. Doctor John Robinson, Dr. Gary Bird and others,
21 correct?
22 A. Yes.
23 Q. You have read work they have published, correct?
24 A. Yes.
25 Q. And you have read published work on nicotine by

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1 researchers for other companies as well, correct?
2 A. Yes.
3 Q. Over the years, as a matter of fact, there has been
4 some degree of assistance you have provided to the RJR
5 Reynolds research department, correct?
6 A. Yes.
7 Q. You have reviewed, your laboratory has reviewed some
8 blood samples for them for experiments they were doing?
9 A. Yes.
10 Q. And you told us earlier with respect to Philip Morris
11 some of the discussions you had with Dr. Kathy Ellis about
12 some research you had done as well?
13 A. That was a little different. That, Philip Morris
14 contacted me with an offer to support an experiment which
15 was not in fact supported in a relevant way. That I don't
16 consider that, the same thing, my laboratory doing analyses
17 for some of the earlier RJR studies.
18 Q. So, you weren't actually doing the analyses for
19 Philip Morris, but you at least had a discussion with them
20 about some experiments; is that fair?
21 A. I had a discussion because the critical aspect of
22 testing some of the questions with pH depends on having
23 cigarettes that only the industry can make. And I wanted
24 to try to get those cigarettes, and I couldn't.
25 Q. By the way, did you know that R. J.

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Reynolds removed

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reconstituted tobacco sheet that contained ammonia processing from its Winston blend several years ago?
A. I did not know that.
Q. And have you examined, were you provided any of the documents or did you examine or ask for information about what was the pH before ammonia was removed and what was it after?
A. I have not seen those documents.
Q. That would be relevant though; would it not? To the question of whether pH changed with ammonia as used in Winston, it would be relevant to that question?
A. Yes, although I'm, I'm really, I've really not offered an opinion as to whether I think ammonia affects pH. What I said was that pH changed, and the documents say that ammonia manipulation is one way to do it.
Q. And you have been very clear, you haven't offered an opinion that in fact it didn't, it's a way to do it, but you haven't offered an opinion that it hasn't?
A. That's correct.
Q. You have done experiments with Reynolds scientists?
A. Yes.
Q. In 1994, for example, I think I've got the year right, you, Dr. Townsend, and Dr. DeBethesey were invited to participate in the National Cancer Institute expert proceedings on the FTC method?

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A. That's correct.
Q. You had discussions there?
A. Yes.
Q. And that was a panel of what, of about 14 experts, the actual panel?
A. Something like that.
Q. And another example was that in 1996, ten people were invited by the government of Canada to serve on its expert committee on cigarette modification, and you were one of those, right?
A. Yes.
Q. That invited people, could have invited anybody

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throughout the world?
A. Yes.
Q. They invited leading researchers, correct?
A. Well, they wanted people with specific research interest and really those interested to do with product modification and product safety.
Q. And they invited you, you were one of the 10, right?
A. Yes.
Q. And they invited two scientists from R.J. Reynolds, correct?
A. Yes.
Q. Dr. DeBethesey and Dr. Townsend were both invited by the government of Canada to participate in that, correct?

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A. Yes.
Q. And in the course of these meetings and these discussions you have had legitimate scientific back and forth with the R. J. Reynolds scientists, right?
A. Yes.
Q. You don't reject any advice though just because they are from R. J. Reynolds, do you? You don't -- let me ask it this way. You don't reject their views just because of their status; you have discussions with them on the scientific merit, right?
A. Right. And I would have to say my experiences with them in certain areas, I have no question about their comments. Dealing with science, chemistry some of the data, there have been some statements made by scientists about addiction, I think, are disingenuous.
Q. Well, you don't agree on everything, right?
A. I think the data really speak for themselves.
Q. Fair enough.
Now, you would agree that people can and do quit smoking?
A. Yes.
Q. Each year about 1.3 million Americans quit smoking right around there?
A. Something like that.
Q. About 50 million Americans today who used to smoke

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but don't, who have quit?
A. Yes.
Q. And these are people who quit for good; they are
done?
A. Yes.
Q. And today there is about as many former smokers in
the country as there are smokers, correct?
A. Yes.
Q. And for many of those former smokers, as I think you
have said, quitting may have been difficult?
A. Yes.
Q. But still the great majority, I think you said on
direct 95 percent quit on their own without professional
help, right?
A. Yes.
Q. They didn't do, use patches, correct?
A. Right. That may be changing now that patches are
over the counter, but these data were before patches were
over the counter.
Q. Okay. They weren't using patches. They weren't
using nicotine gum. They weren't using nicotine inhalers,
right?
A. Right.
Q. They weren't going into halfway houses or detox
centers right?

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A. Correct.
Q. Now, you mention that sometimes it takes several
attempts before someone quits?
A. Yes.
Q. Isn't it true that the odds assessed on quitting
increase with the number of attempts one has made?
A. Yes.
Q. So, you are not criticizing these people for having
made several attempts. That's a sign of growing motivation
that there have been several attempts?
A. I think so. It's important to encourage people when
they fail to sort of regroup their strength and to do it
again. But I also think it's very strong evidence for the
power of the nicotine addiction, that it takes them many
attempts and so much effort before they can finally stop.
Q. Just like it may take many attempts and a

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lot of
effort before somebody loses the weight they want to. I'm
not saying it's a drug induced situation?
A. People have to eat. People don't have to have
nicotine, unless it gets sold to them.
Q. Out of these 50 million people who quit, doctor,
union members have quit, haven't they?
A. I'm sure.
Q. Blue collar people?
A. Yes.

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Q. White collar people?
A. Yes.
Q. People in big cities, people in towns?
A. Yes.
Q. People with M.D's, people with Ph.D's?
A. Yes.
Q. People who haven't finished high school?
A. Yes.
Q. The entire spectrum of American society is included
in there?
A. Yes.
Q. Did you come to tell this jury anything about the
specific quitting or smoking experiences of any individual
member in the ironworkers union?
A. No.
Q. Or the dealers union?
A. No.
Q. Or any of the unions that are involved in this case?
A. No.
Q. Did you attempt to, did you yourself or have you
commenced a survey that sought to get data from the
individual fund participants?
A. No.
Q. Did you inquire as to whether medical records or
smoking histories were available to you with respect to any

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individual union fund participant?
A. No.
Q. So, am I correct, doctor, that you have neither asked
for or reviewed the medical records or the deposition
testimony of any individual fund participant?
A. Correct.
Q. Now, this is your third straight business day on the
witness stand, right?
A. Unfortunately, yes.
Q. And you were testifying last week in a

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case against
tobacco companies out on the west coast, correct?
A. Yes.
Q. That was Thursday or Friday?
A. Yes.
Q. And when you testified there in that case, you had
read medical records of the individual in that case,
correct?
A. Yes.
Q. And that was important to understand the individual,
correct?
A. Well, this was an individual, an addiction related
case, yes.
Q. And to give that opinion on addiction, as you said
out there, you needed to know something about the
individual and read their records, right?

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A. To make a comment about one individual, that's
correct.
Q. And then in January, you testified in another tobacco
case on the west coast against certain tobacco companies,
right?
A. Yes.
Q. And in that case you read the medical records too,
didn't you?
A. That was another individual case; is that correct?
Q. Now, the 50 million people who have quit smoking,
doctor, they all smoked cigarettes with nicotine, right?
A. Yes.
Q. And the people who were going to quit this year, next
year, and that they are all smoking cigarettes with
nicotine too, correct?
A. Yes.
Q. You would agree with me that people don't start
smoking because of nicotine, correct?
A. Absolutely.
Q. And nicotine doesn't make it impossible for people to
quit, correct?
A. Well.
Q. You may believe it's hard, but it doesn't make it
impossible; is that correct?
A. Well, that's correct -- well, you say there are some

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people who try as they may seem never to be able to quit.
So, there maybe, and this is a population that we have been
trying to deal with in other ways.
Not physically impossible, clearly you can put
someone in the hospital ward and not give them cigarettes
and they will stop smoking. But there are some people on
their own who seem not able to quit.
Q. But you said before it is not impossible for anyone
to quit?
A. It's not physically impossible; that's correct.
Q. Now, nicotine doesn't prevent a smoker from
understanding the warnings on the pack, does it?
A. Yes and no. It doesn't prevent them from reading the
warnings, understanding the words. It may influence their
interpretation of the warnings because someone who's
addicted is looking for excuses to keep on doing the
behavior that they want to do.
This is true for any kind of drug addiction.
And for example, with the warnings, if something comes out
and says the Surgeon General says that smoking is harmful
to your health, many smokers will say, that's the
government telling me what to do.
The tobacco company is not saying that,
they are selling the product. It's legal. It couldn't be
that harmful. It's just the government telling me what to

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do.
So, people interpret warnings in different ways
if they are addicted or not addicted.
Q. And some people don't want the government telling
them what to do?
A. Yes.
Q. But that doesn't go to my question which is
intellectually, nicotine doesn't prevent someone reading
and understanding warnings. They may not want to read it
and act on it, but I'm talking reading it

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intellectually?
A. Reading the words and understanding what they mean for the cigarette smoker is influenced by being addicted. There is a lot of evidence asking people what they think the risk of cigarettes are and cigarette smoking. They think there are less risks than non-smokers.
Q. Have you seen any research that shows the general public itself, and smokers included as a subgroup, overestimate the mortality risk of smoking? Have you seen that research?
A. I've seen different sorts of research like that, but also again if you look at the perception of a smoker compared to a non-smoker, smokers perceive it to be less risky than non-smokers.
Q. But, you are familiar with the research that even smokers overestimate the risk?

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A. I don't recall the specifics. It may well be. I don't recall the specifics.
Q. Now, nicotine doesn't prevent or interfere with an individual's ability to hear what people tell them about smoking, does it?
A. No.
Q. So, if he hears from parents, doctors or friends that he ought to stop, he or she ought to stop, they can hear that and take that in, right?
A. Yes.
Q. And Ohio union members who smoke, they are as able to understand those warnings and listen and hear as well as anybody else, right?
A. Yes.
Q. There are some studies in fact that show, I think you mentioned, that nicotine actually increases concentration for people, their ability to focus, right?
A. Yes and no. Let me explain that.
The simple answer is yes. There is an effect.
The biggest effect is actually reversing the impairment of concentration that occurs when a smoker is not smoking.
What has been shown, is there is a decrement in

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the
performance of a smoker without a cigarette. The smoker
concentrates less well than someone who's not a smoker.
That gets normalized as soon as they get a cigarette.

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There has also been some research using the
more subtle techniques showing the reaction time test.
And things like that can be improved by nicotine, even in
a non-smoker. The magnitude of that effect is much less
than the reversal of the inherent that occurs.
So, most of the concentrating of cigarettes is
normalizing function of someone who's in withdrawal.
Q. But there are such studies, correct?
A. Yes.
Q. And, by the way, with respect to these studies, and
the statistical studies that have been done with respect to
smoking, haven't there been some studies that show, again
with respect to central nervous system functions is all I'm
focusing on now. There have been some studies on the
central nervous system that shows that smoking has a
protective effect, statistically, on conditions like
Alzheimers and Parkinsons?
A. Yes.
Q. And while nobody understands, that theory is either
something about the effect of nicotine on the central
nervous system that prevents that, those conditions occur
less often in smokers, correct?
A. Well, it's not clear if it's nicotine or something
else in tobacco smoke.
Q. Fair enough.

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A. I can explain that, it's complicated, but there are
different theories, but there is some protective effects of
smoking.
Q. On Alzheimers and Parkinsons?
A. Yes.
Q. Now, when you are back in San Francisco, when you are
not traveling, you see patients, what, about a

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third or a
8 third of your time?
9 A. Yes.
10 Q. Because you have research and
administrative
11 responsibilities et cetera?
12 A. Yes.
13 Q. And when you see your patients, and
primarily in
14 internal medicine, cardiology type practice --
15 A. Yes.
16 Q. When you see those patients and they are
smokers, you
17 advise them to quit, correct?
18 A. Yes.
19 Q. You don't tell them they can't quit, do
you?
20 A. You mean, tell them that they are unable
to quit?
21 Q. Yes, I'm sorry?
22 A. No.
23 Q. And you don't, when you are in a session
with a
24 patient, you don't call them addicts, do you?
You don't
25 say you are an addict?

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1 A. No. I mean, I might, I wouldn't say that
we haven't
2 talked about addiction. Some patients will just
tell me
3 I'm addicted to this stuff.
4 In general, I just focus on the fact
that you
5 are a smoker and we have to get you to stop
smoking.
6 Q. You don't as, a matter of your general
practice, when
7 a smoker comes into you, and you advise them not
to smoke,
8 you don't tell them they are and addict, do you?
9 A. Not as a practice, no.
10 Q. For someone who wants to quit, motivation
is a very
11 important factor?
12 A. Yes.
13 Q. Indeed, I think some studies have shown,
and you have
14 said motivation is even more important than any
individual
15 cessation aide like a patch or inhaler, correct?
16 A. Well, yeah. It comes back to my very
first statement
17 about having to balance the disruptive effect of
not
18 smoking requires very strong something on the
other side
19 that says why I have to quit.
20 And so it takes a strong factor on
the quitting
21 side to balance the strong factor on the keep
on smoking

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side.
Q. And that strong factor is individual self-emphasis or --
A. Which is influenced by a lot of things, yes.

1759
Q. And indeed, even the packaged material that goes with some of the stop smoking aides advises people that without motivation this doesn't do you any good, right?
A. Yes.
Q. Now, nicotine has a pharmacological effect because of its bio availability; is that fair to say?
A. Well, that's a funny way to say it scientifically. What is.
Q. Maybe because I'm not a scientist?
A. Is the point that it's supposed to, that it has to enter the body.
Q. Bio availability, as I understand it, and correct me if I'm wrong, doctor, it means the uptake into the body and eventually its transmission up to the central nervous system?
A. Well, it just refers to uptake into the body.
Q. Without bio availability then, it wouldn't have the effect on the receptors, et cetera, that you have been talking about, correct?
A. It would not have the effects I was talking about. There are some issues, and I don't know if you want to get into this, their are ways that nicotine can have effects without even being absorbed on receptors in the throat and mouth.
Q. It could have taste effects, taste sensations that

1760
have nothing to do with receptors in the brain, correct?
A. Well, it can also stimulate nerves that impact on the brain also, that are -- even before nicotine gets into the blood stream. So, there are other things that it can do, but the bulk of the effects I believe involve nicotine getting to the brain.
Q. And affecting the receptors as you

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described, right?
A. Yes.
Q. Now, nicotine isn't the only thing that affects receptors, is it?
A. No, many things affect receptors. All drugs almost affect receptors.
Q. And caffeine can cause up regulation of receptors; can it not?
A. Yes.
Q. And milk can, correct? Particularly, isn't there a substance called tryptophan in milk?
A. I'm not sure about up regulation. Tryptophan can affect neurotransmitters.
Q. Does that mean it's psychoactive?
A. It has some psychoactivity.
Q. And psychoactivity, rather than me to give you an explanation that would be scientifically correct, can you tell us what briefly psychoactivity means, an effect on the brain and it's neurotransmitters?

1761

A. It really means something that affects mood or behavior by effects on the nervous system. And in fact milk makes you slightly drowsy. And that's psychoactivity.
Q. So, mom was right when she used to tell us to have a glass of warm milk. She told us to go to bed. There is some science on that now?
A. Yes.
Q. How about chocolate? That has some psychoactivity through the theobromine?
A. Some.
Q. Indeed, aren't your receptors in the brain working all the time, whether you got a substance that is pharmacologically active as a drug or not?
A. Yes, the question we are talking about here is, is sort of driving it or controlling it with a drug that you are administering on frequent basis.
So, it is, but on a spontaneous basis receptors are how the brain works.
Q. And indeed, there is increased levels of psychoactivity that occurs depending on one's stress level, one's anxiety, et cetera, right?
A. Well, that's a funny way to ask the

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question. There
certainly are. Brain chemicals release phenomenon
associated with different moods and behaviors.
Psychoactivity is talking about a drug factor, or I'm not

1762
sure what the question is.
Q. Let me see if I can ask it again. And if not, tell
me where you think I'm wrong.
You can get chemical reaction among the
receptors through various states of anxiety, excitement,
stress, whatever, correct?
A. Yes.
Q. Indeed, a witness might have increased receptor
activity. So might a lawyer in a situation like this,
correct?
A. Yes.
Q. Now, I want to put aside for a moment, doctor, the
receptors and the brain issue and nicotine. We'll come
back to that later. And I want to follow up the point you
made a moment ago about another possible effect of nicotine
that relates to the mouth and throat, okay?
A. Yes.
Q. So, these questions, right now I want to focus on the
mouth and throat and nicotine does contribute, does it not,
to the taste and sensation of smoking?
A. Yes.
Q. And you know that smokers and indeed you see this in
some of the documents and published literature, smokers
refer to things like throat scratch or throat grab or mouth
feel when they are talking about smoking, correct?

1763
A. Yes.
Q. And that phenomenon is referred to as impact,
correct?
A. Yes.
Q. And impact as you use the term, and as others use it,
relates to the effect in the mouth and throat area of the
smoke, correct?
A. Yes.
Q. And scientists sometimes refer to those effects as

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organoleptic effects, correct?
A. Organoleptic is just a very vague term. It's not very specific. And I don't think it's specific for that effect it really has to do with, you know. It's not a good term.
Q. I didn't mean to suggest it was specific to smoking and mouth, throat, but that is a term used in reference to that, correct?
A. I think so, but I would have to say I never understood why that term was used.
Q. Now, when you talked about free nicotine earlier, these Ns that aren't in the circle, that was your free nicotine?
A. Right.
Q. And to be fair, you weren't trying to be mathematically precise or trying to draw to scale. You

were just demonstrating an issue?
A. Yes.
Q. Let's take it in that spirit. But the free nicotine, the nicotine and the gas, that's the nicotine that is absorbed and hits in the mouth and throat, correct?
A. Yes.
Q. And that nicotine does not reach and bind with the receptors in the brain, correct?
A. Right. It may impact brain activity by working on the sensory nerves in the throat, but it does not reach the brain at that time.
Q. And that effect of the free nicotine in the mouth and throat being part of the taste and sensory experience of smoking is an important part of smoking. It's not all of it, but it's an important part of it?
A. Yes.
Q. And the effect that that has -- that that free nicotine has in the mouth and throat is it stimulates some nerve endings in it.
A. Yes.
Q. And those are the same kinds of nerves that are stimulated impact-wise by a hot chili pepper, right?
A. Well, if you talk about sensory nerves

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broadly, yes.
Q. There are specific nerves that have as astilcholine
receptors that nicotine works on. I'm not sure chili

1765
peppers are working on the same nerves, but if you want to
look at the whole category of sensory nerves in the throat,
nicotine would work on one set and chili pepper on another.
Q. So, nicotine and other substances may not work on the
exact same set of nerves in the mouth and throat, but it's
the same general phenomenon for taste and sensation; is
that fair?
A. Yes, I'm not sure about the other part of it, though,
which I said that there are connections between sensory
nerves in the throat and the brain.
And so that you actually can get brain
activation from activating sensory nerves. At least, that
has been shown in animal studies and likely true in
people.
Q. I'm sorry, I missed the end?
A. And is likely to be true in people. For nicotine, I
don't know if that's true for chili peppers.
Q. With respect to what you just said shown in animal
studies, and likely to be shown in people, it hasn't been
shown in people because those experiments haven't been done
yet, correct?
A. That's right; they are hard to do.
Q. And indeed, you said with respect to that very issue,
at your deposition, didn't you, that this, that's the
phenomenon you just described about the special, a special

1766
reaction of nerves in the mouth and throat sending a signal
to the brain is a theory until it's proven with human
experiments, correct?
A. Yes, there is good evidence based on animal studies
that's true, but it's not been demonstrated in humans.
Q. Now, because of the effect of these of the free

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nicotine particles on the mouth and throat, doctor, it's fair to say, isn't it that smokers don't smoke only for whatever effect there may be on the central nervous system and the receptors in the brain; is that fair to say?

A. There is one issue which I didn't really talk about, and that's the whole issue of conditioned aspects of smoking. And I should explain that because that's important and that relates in part to this.

Q. Could you answer my question first? Do you need to explain that to answer my question? My question only is, do smokers smoke only for the effect on the receptors in the brain, only?

A. Well, it's complicated question because it depends on the time frame. If you ask -- ultimately, the question is yes. When you are getting nicotine, like if you didn't get nicotine to your brain, you would not keep smoking.

Once you are a smoker and you are getting nicotine on your brain, you come to like or to appreciate and like a lot of other things that go along with nicotine

delivery to your brain.

For example, the taste, the smell, handling a cigarette, all those things, the bite, all those things become rewarding because they are linked to smoking, to getting nicotine to your brain.

If you take nicotine out, you might smoke a cigarette for a day or two and get some satisfaction because you like these other things. But within a few days you stop smoking because there is no nicotine going to your brain.

So, the answer to your question is complex. In the short run, yes; those things are important. In the long term, no nicotine to the brain, no smoking.

Q. Converse is true also, isn't it, that it's been shown

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15 in experiments that the mere presence of nicotine isn't
16 enough to keep somebody smoking.
17 Let me ask my question better. I can see I've
18 puzzled you.
19 Isn't it true in the 1964 Surgeon General's
20 report you reported on experiments in which lettuce based
21 cigarettes were made, lettuce based, and then laced with
22 nicotine, and smokers wouldn't smoke them; is that true or
23 not?
24 A. I have a vague recollection, but I don't recall the
25 study's results. I can't comment on them.

1768
1 Q. Would that help if I referred you to that page,
2 doctor?
3 A. Sure. And show it to me, please.
4 Q. Sure. Did I say that was the '64 report?
5 A. Yes.
6 Q. Okay. Well, that may be part of the confusion. I
7 think it may be the '81 report. I read my notes wrong.
8 This is -- you are familiar with the '81 report?
9 A. Yes.
10 Q. Let me refer you down here, doctor, at this sentence
11 that begins there. Does that say that at the same time it
12 has been difficult to demonstrate that smokers will use
13 nicotine in a non-tobacco medium. In one study lettuce
14 leaf cigarettes injected with nicotine were smoked for one
15 week periods at intake levels only approximately 50 percent
16 the rate of subject's own brand, and with the protest of
17 reduced satisfaction, do you see that?
18 A. But I would have to say that this experiment is
19 problematic for some of the reasons I just talked about,
20 for conditioning. And we found this too. That people
21 become used to delivering nicotine in a particular vehicle,
22 so to speak, to use Dr. Dunn's terms the vehicles to smoke.
23 And they learn there are certain taste
24 characteristics of the smoke, certain bite
25 characteristics, and people like their own cigarette

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1769

smoke. If you give them a strange cigarette, whatever it is, they tend not to smoke as much, they don't like it as much, and they have a hard time smoking it.

So, part of the problem is they are switching to a cigarette that tastes terrible. But if you gradually wean someone, or if you started someone on lettuce cigarettes with nicotine from the very beginning, it's quite possible they would ultimately smoke them and for the same nicotine they would for a tobacco cigarette.

Q. You haven't done those experiments, have you?

A. And no. No one would ever do that. And I'm just saying the study that you showed me does not prove the some point you made.

Q. Well, the Surgeon General said at least people have not turned to nicotine in a non-tobacco medium; isn't that what it said?

A. Well, why would you do it because nicotine is naturally available in tobacco. It's cheap in tobacco. Why would you make the trouble of having nicotine in something else.

Q. There has been a lot of work, hadn't there doctor, on tobacco substitutes?

A. That's to reduce the risk of, I don't think burning lettuce is going to reduce the risks. It still generates tar and other constituents.

1770

Q. Hasn't there been research done on tobacco substitutes to which nicotine was added and they were failures too?

A. Can you be more specific? What research?

Q. Are you familiar with any of those attempts in Britain or in Europe with respect to tobacco substitutes in which nicotine was added? Do you know anything about that or not?

A. I'm not sure what you mean. Are you talking about things like Premier and Eclipse.

Q. I'm about to get there, but I'm not there

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yet. I'm
talking about some time ago actual tobacco substitutes?
A. I don't recall the studies.
Q. Now, and indeed, let me just ask you one or two
questions now about Premier. I have some more later.
Premier was a cigarette that my client R.J. Reynolds put
out on the market for a short period of time?
A. Correct.
Q. And the Premire cigarette had no traditional tar,
correct?
A. I'm not sure what you mean by no traditional tar. It
had much more lower tar delivery than most cigarettes by
some test. The characteristic of the cigarette was
different.
Q. It had no combustion products; is that fair to say,

1771
because it didn't have combustion?
A. As I recall, there was a small amount of combustion,
not nearly as much as a regular cigarette. But there was a
small amount of combustion.
Q. Would you at least agree that the tar was
substantially, significantly different?
A. It was lesser an amount.
Q. It was in some ways 80 90, 95, 99 percent reduced,
correct?
A. It was a lot reduced. I forget the numbers, but it
was markedly reduced.
Q. And while it had that very low level of tar, it had a
light level of nicotine, correct?
A. It actually delivered as much nicotine as a regular
cigarette.
Q. Okay. And that was a failure in the marketplace and
consumers reported they didn't like it, right?
A. Right. But that's the same issue that I just talked
about. If you go back to when filters were added to
cigarettes, smokers did not like filtered cigarettes, they
thought they were terrible. They had no taste, they were
weak.
But over time smokers were educated about it
and/or started smoking it. They switched, and now smokers

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like filtered cigarettes, the same ones smokers would have

1772

thought were terrible years ago. People's taste about
cigarettes are educatable in a sense.
And if you said let's make a transition, let's
change the characteristics of our cigarettes, let's reduce
the tar gradually over 10 years and end up with a Premier
cigarette 10 years later, I think you could probably get
most smokers to smoke a Premier.
But if you are trying to put it in a cigarette
that they smoke every day for 20 years, and say here is
something that is totally different, they won't take it.

Q. Going back you say the government and voluntary
health organizations urged people to quit, but if they
didn't quit, to smoke lower tar and nicotine, correct?
A. Yes.
Q. So, was there any urging from the government and the
voluntary health community for people to switch to Premier,
were they supporting Premier?
A. There was some debate within the community about
doing that, but I don't think there was any public support.
Q. Indeed, Surgeon General Koop told the FDA to pull it
off the market, didn't he?
A. I don't recall if he told them to pull it off or not.
Q. Now, the pH range of commercially available American
cigarettes, it's between 5.5 and 6.5 generally?
A. Yes.

1773

Q. That's the same point the commentators have made,
correct?
A. Yes.
Q. And if we go back in the literature, you would see,
would you not, Dr. Benowitz, that from the 70's until now,
that's been pretty consistent, correct?
A. Yeah, there has been some bouncing around. For
example, we talked about Marlboro that started at 6.7 in
the 70's and is now down to 6.1 or 6.2.

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Q. When you say 6.7, where do you get that from?
A. That was from the RJR document.
Q. We'll get into this later, but do you know what method was used for that?
A. I don't remember. I would have to look at the document.
Q. You do know from the RJR documents that even their own pH testing used different methods over time and even different methods at the same time?
A. I know different methods are available. I don't recall the specifics with respect to RJR.
Q. And you do know there is variability with the various methods, correct?
A. Right. But one thing which is hard to argue with, is the difference between the Winston and the Marlboro and Winston was 5.7 and Marlboro was 6.7. No matter how you

test it, that difference would persist.
It's true that the scale may change, but the cigarettes were different, and that's clear.
Q. Do you also know that when testing pH R. J. Reynolds for example takes a number of measures and then takes averages, looks at high, low, even at the same battery of tests?
A. That's what most people do. I don't know the specific procedure at R.J. Reynolds.
Q. Do you know whether that 6.7 was what statisticians call an outlier; was it the highest number, was it an outlier; was it an average?
A. I don't know for sure, but I assume if R.J. Reynolds was putting such a huge amount of efforts into that, they wouldn't have just taken one measurement. I mean, their scientists are not stupid.
Q. Well, you know that memo you put up from Dr. Rodgman that you said talked about catching up?
A. Yes.
Q. Okay. Do you know that the Winston pH measurement on there was the single highest measurement for that year out of all the testing; did you investigate that?

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23 A. No.
24 Q. Did you investigate whether or not from the data that
25 was available from that time period what the other pH

1775
1 measurements were at R.J. Reynolds?
2 A. I don't understand the question on the Winston.
3 Q. On the Winston or anything else, any other pH test
4 they did, did you go beyond that memorandum to see what was
5 available that year?
6 A. That year, no.
7 Q. Now, I want to ask one quick question about this
8 other chart, and maybe I'm done with the chart, doctor.
9 Am I correct, if I understand this, your
10 arterial blood over time, and this is, this curve you drew
11 was nicotine reaching the central nervous system?
12 A. Well, it's in the blood. But the levels in the brain
13 would mirror the blood levels.
14 Q. This was not meant, that's what I wanted to clarify,
15 this was not meant to deal with, or was it, the nicotine in
16 the mouth and throat?
17 A. No.
18 Q. So, that is not meant to indicate anything with
19 respect to pH and the division between free nicotine and
20 bound nicotine, correct?
21 A. Correct.
22 Q. Because that was in your pH discussion. And I got
23 confused as to whether you meant to include it in that or
24 not; you did not?
25 A. Correct.

1776
1 Q. Now, the fact that tobacco contains nicotine is
2 something that's been known for well over a hundred years,
3 correct?
4 A. Yes.
5 Q. And the fact that nicotine has effects on the nerves
6 of the brain, that's been studied throughout the century as
7 well, correct?
8 A. Yes.
9 Q. A lot of research done by tobacco companies, a lot of

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10 research done by people outside of tobacco companies,
11 right?
12 A. Yes.
13 Q. And you are familiar with the collection of the
14 Larson Savette book Tobacco Experimental Clinical Studies
15 was published in '61?
16 A. Yes.
17 Q. And the Surgeon General cited that book; did he not?
18 A. Yes.
19 Q. In his '64 report?
20 A. Yes.
21 Q. And what Larson Hague did, or Larson and Savette
22 eventually Larson, Hague and Savette did, what they call a
23 survey of all the exigent published literature related to
24 tobacco?
25 A. Yes.

1777
1 Q. And I'm not going to get into the substance of that
2 research with you, but I just want to say, even doing that
3 survey and collecting all that information in one place was
4 a significant event for researchers in the area, correct?
5 A. It was very helpful source; that's for sure.
6 Q. Indeed, when you want to redo research today and you
7 can sit down and Medline or one of the other services, and
8 punch in and get hundreds of data points, right?
9 A. Yes.
10 Q. Back then they didn't have personal knowledge,
11 computers, Medline, all the research had to be done walking
12 somewhere, studying, finding what you could?
13 A. Yes.
14 Q. And that's why the Surgeon General cited this and
15 referred to it because it was really a compendium of
16 everything that was out there as of that date?
17 A. Yes.
18 Q. And you know that work was funded in part by the
19 funds from these companies, correct?
20 A. Yes.
21 Q. Now, there has been an understanding, you would agree
22 with me, I assume from early in the century, last century,
23 as far as we want to go back, that tobacco's been used that

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24 the use of tobacco can be hard to quit?
25 A. Yes.

1778
1 Q. You know the old Mark Twain story and the stories
2 even before then, correct?
3 It was known in 1964 and before that it could
4 be hard to quit and that people often had strong urges or
5 cravings to smoke, correct.
6 A. Yes.
7 Q. It was known before 1964 that nicotine had
8 psychoactive effects?
9 A. It was certainly known by scientists. You know, the
10 industry has from time to time tried to play that down.
11 Q. Well, my question is, it was known before 1964 that
12 nicotine had psychoactive effects, right?
13 A. Yes.
14 Q. And indeed, from your early days of smoking, even
15 smokers themselves would joke about it, recognize it, talk
16 about it, say I need a smoke to calm my nerves, things like
17 that, correct?
18 A. Yes.
19 Q. And indeed there were a lot of complaints early in
20 the century, were there not, from people about the fact
21 that smoking was hard to quit?
22 A. Yes.
23 Q. You are familiar with Henry Ford; are you not?
24 A. I'm not sure; tell me the story.
25 Q. Not in this context, maybe. The Henry Ford of the

1779
1 automobile industry, he actually published a book called
2 the Case Against the Little White Slaver, saying it was
3 hard, accusing tobacco of being impossible to quit,
4 difficult to quit, it made people slaves. Are you familiar
5 with that?
6 A. I've not read that book. I should get a copy.
7 Q. And with all of that, do you know -- by the way,
8 Thomas Edison was from over, born over west of here toward
9 Norwalk. Do you know that Thomas Edison refused to hire
10 smokers because of the effect on the central nervous

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system; that's what he said?
A. No.
Q. Now, even with all that was known scientifically and otherwise, the Surgeon General in 1964, that committee when they looked at this issue, and they did look at the issue of how to characterize smoking behavior, right?
A. Yes.
Q. They concluded at that time that the best way to characterize it was as an habituation, correct?
A. Right. And that had to do with their definitions that they were in place at that time.
Q. And indeed, I want to go through a few of these definitional issues with you. And that's an important point to keep in mind. That the behavior of smoking is the behavior of smoking, but the definitions can change over

1780

time, correct?
A. Yes.
Q. So, we can, smokers have been smoking for years and generations, but scientists and lay people, whatever, they may change the way they describe the behavior, correct?
A. Yeah, but I must say there are also, may change their appreciation for how tenacious the behavior is, what actually drives the behavior, so it's more, it's a little more complicated.
Q. Fair enough.
And in 1964 the Surgeon General said it was important to distinguish smoking from addictions, since the biological effects of tobacco, like coffee and other caffeine containing beverages, are not comparable to those produced by morphine, alcohol, barbiturates, and many other potent producing drugs. That was said in '64 correct?
A. Yes.
Q. And that's because they were using a different definition than you used, correct?
A. Yes, they were focusing on the heroin model, which is really intoxication, and severe withdrawal symptoms, as

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well as anti-social behavior, had to be part of a drug to be addictive. And by that definition, in fact, cocaine and amphetamines, which we now think of as highly addictive,

1781

would not be addictive either.
Q. I was just about to get to those points. You mentioned in the 1964 model that they used for characterizing the smoking behavior, they did look at issues of intoxication, correct?
A. Yes.
Q. And concluded that smoking was not intoxicative?
A. Yes.
Q. They looked at the issue of whether smoking caused anti-social behavior?
A. Yes.
Q. And concluded it did not?
A. Yes.
Q. And looked at whether it caused severe withdrawal when one quit and could you conclude it did not?
A. Well, withdrawal of a certain nature, they really were talking about life threatening withdrawal symptoms, such as occurs with heroin or alcohol, not severity.

Because although nicotine withdrawal is different, many people think it's quite severe with respect to disruption of their lives. So, it's not, they are not going to have convulsions. But they may not be able to work right. They may not get along with their family and friends.

It can be quite disruptive. It's not mild, but

1782

it's not life threatening in the same way as having DTs for alcohol withdrawal.
Q. And people who go on diets have to change their diet fundamentally. They can get irritable and hard to live with their family as well, different reasons but they -- can't they?
A. But that is something that is well described and has a very clear neurochemical basis. For the diet stuff,

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there are other factors. It's not comparable.
Q. Now, after the definition and characterizations and habituation in 1964, Surgeon General discussed and characterized the nature of smoking from time to time in subsequent reports, correct?
A. Yes.
Q. And are you aware that in the 1979 report, 15 years later the Surgeon General again referred to smoking as an habituation?
A. Yes; I believe that's correct.
Q. 15 years later?
A. Yes.
Q. And then in 1981, the surgeon general referred to smoking as a chemical habit; you are aware of that, aren't you?
A. I forget the exact dates, but I don't contest that.
Q. And that was what, 17 years after the initial report?

1783

A. Yes.
Q. And it was from '64 until 1988 when the Surgeon General formally changed the public health services characterization of smoking behavior?
A. Yes, but I would have to say that it wasn't just an isolated thing in the Surgeon General. The scientific community had also evolved from that habituation to dependence, even if in 1964 the World Health Organization began to talk about drug dependence focusing not on intoxication, and life threatening withdrawal symptoms, but loss of control over drug use, use of a drug to personal or social harm, all of the things that would fit nicotine as well under drugs.
So, by 1964 the World Health Organization was lumping tobacco with other drugs, such as heroin and cocaine, on those characteristics.
The Surgeon General in 1988 just sort of caught up with that and said this is really a dependence and analyzed it in a specific way, what's the difference and what's the same about nicotine versus other

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drugs.
Q. Now, my question, though, is in terms of the chief of
our public health service, Surgeon General, correct?
A. Yes.
Q. It wasn't until 1988 that he formally -- or she, I
can't remember right now -- formally changed the definition

1784
in a formal report, correct?
A. Yes, it was Dr. Koop; that was a he.
Q. Okay. Now, and the definition used in '88 is the one
that you described earlier on your direct examination,
correct?
A. Yes.
Q. That did not include intoxication, correct?
A. Correct.
Q. Or severe physical withdrawal symptoms of the type
you just touched on?
A. Again, I don't like the word severe. I would say
life threatening.
Q. Nothing about anti-social affects, et cetera?
A. Correct.
Q. And all of those things I just mentioned were part of
the classic definition used in '64, correct?
A. Yes, yes.
Q. Now, you are familiar with the American Psychiatric
Association; are you not?
A. Yes.
Q. That's a prestigious and respected scientific group?
A. Yes. It's the organization of psychiatrists.
Q. And they published from time to time a document known
as the diagnostic and statistical manual?
A. Yes.

1785
Q. DSM, it's known as?
A. Yes.
Q. This is a copy of it?
A. Yes.
Q. You probably have one?
A. Yes.
Q. And what this book does, in all of these pages is
catalog and index the extraordinary variety, shall I say,
of human mental conditions?
A. They index them and they try to set up diagnostic

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criteria for them.
Q. And it covers A to Z?
A. Yes.
Q. Anything that anybody would know of as a mental condition is in here, one way or the other?
A. More or less.
Q. And it was and they addressed drug abuse and dependency; do they not?
A. Yes.
Q. And have at various periods of time over the years?
A. Yes.
Q. And indeed this has been revised a number of times.
I'm holding up DSM 4, I don't know if you know offhand when that came out, looks like 1994, DSM 4, but there was a DSM 1, 2, and 3 before that, correct?

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A. Yes.
Q. Now, it was not until 1980, was it doctor, that the American Psychiatric Association created a diagnosis for tobacco dependence?
A. I don't remember that date.
Q. And after the time in 1988 when the Surgeon General characterized smoking as an addiction, the American Psychiatric Association came out with DSM 4, correct?
A. Yes.
Q. And DSM 4 characterizes tobacco as a dependence, correct?
A. Yes.
Q. They don't use the word addiction in this book?
A. Yes, correct.
Q. And indeed they you talk in here about a condition that may be known as caffeine dependence, correct?
A. Yes.
Q. And they even say that there is a condition called caffeine intoxication, correct?
A. Yes.
Q. Now, let's talk about that coffee issue for just a moment. Remember when we talked about the 1964 report, Surgeon General said smoking was more like caffeine and that behavior than it was like morphine and that behavior?
A. Yes, that's the, that's been found to be totally

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wrong, but that's what they said in 1964.
Q. Now, you would agree that the pharmacological effects of cigarette smoking are more like caffeine than like cocaine, wouldn't you?
A. Well, they are different from both. If you are talking about intoxication, yes. If you are talking about dependence, nicotine is much closer to cocaine than caffeine. So, it depends what characteristic you are talking about.
Q. Okay. Doctors advise people to stop using caffeine because of some physical conditions it can cause, right?
A. Yes.
Q. It can cause anxiety, it can cause tachycardia, rapid heart beat?
A. Yes.
Q. It can have some other reactions in the cardiac system, blood pressure, et cetera?
A. Yes.
Q. And some people don't follow that advice, right, because they like their caffeine?
A. Occasionally it has been my experience that most people, if you tell them to switch for decaf, for example, can do it. It's not -- it's not nearly the same problem, either health-wise or changing the behavior, to get people to switch to beverages without caffeine than it is smoking.

1788

Smoking is just a whole order of magnitude, different issue in terms of how hard is it to change behaviors, and the consequences the health effects of caffeine are really trivial compared to smoking.
THE COURT: Mr. Weber.
BY MR. WEBER:
Q. While we are looking for that, you have written on caffeine and its pharmacologic effect, have you?
A. I have.
Q. And you have concluded that using the definition from the 1988 Surgeon General's report one can conclude that

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caffeine is addictive, correct?
A. Well, it can be. But I also said that the number of people who are addicted are ten percent or fewer of caffeine users. And those are people who are using 8 and 10 cups of coffee per day.
Q. Let me show you, doctor. This is an article you wrote on the clinical pharmacology of caffeine, and I think we have a 1990 date on that?
A. Yes.
Q. So that was after your work on the Surgeon General's committee in the 1988 report?
A. Yes.
Q. And you yourself in this article ask the question is caffeine addictive, correct?

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A. Yes.
Q. And you concluded that you were going to use the criteria that the Surgeon General had used, correct?
A. Yes.
Q. And you said the three major criteria are psychoactivity, drug reinforced behavior, and compulsive use, correct?
A. Yes.
Q. And you said caffeine, that caffeine reinforces has been demonstrated?
A. Yes.
Q. And then you went on to include the development of tolerance, physical dependence and intense desire; do you see that?
A. Yes.
Q. And then you ended up saying there is a group of coffee drinkers who appear to meet the addiction criteria, correct?
A. Right, but that group is small. It's ten percent, and it's not associated with any significant health issues, really. There are a few people who have problems, so that the magnitude of addiction problem is less and the implications of it are totally different.
Q. How many people, how many Americans does that ten percent of coffee addicts represent?

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A. I would say 10 percent at most. I don't have the numbers, it was actually hard to get this. But the people who are addicted to caffeine are the ones who are smoking coffee all day long.
Q. Drinking?
A. Sorry, excuse me, drinking coffee all day long. And find that they can't go a day without coffee, that they have severe headaches, that they have severe withdrawal symptoms.
There are people like that, but I think it's many fewer than ten percent of the population. I've not been able to get data. I fully tried to get that on the population as a whole, but it's a small segment.
It's not the 80 percent of cigarette smokers who are dependent. And it's also not associated with a 1 and 2 or one in 3 chance of dying prematurely as a consequence of the use of the drug. So, the issues around it are totally different.
Q. Let me ask this, because I think I'm confused on this. And if you could answer it yes or no, I would ask that you would. But if you can't, answer it as you have to.
Are you saying that on the issue of addiction, that the, that one thing you consider are the risk of smoking or the risk of caffeine to health? Is that, does

that go into the mix or does it not?
A. Not in terms of the definition of addiction.
Q. That's what I thought?
A. But in terms of what you, how much you care about it it does. I mean, I don't care if a drug is addicting or if it doesn't hurt anybody, fine. But I do care if it kills them. So that's my response to addiction.
Q. Now, back on the criteria you are using, you refer to some of these criteria as minor, correct?
A. Yes.
Q. And it is your position that tolerance, et

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cetera,
are minor criteria in examining addiction, correct?
A. Yes. Yeah, those by minor it's meant that these are characteristics that are often present but are not the core issue is really loss of control of drug use. And so these are things that are often present in drug addiction.
Q. And if they are minor criteria for caffeine and coffee, they are minor criteria for smoking, aren't they?
A. Yes.
Q. You are not applying a double standard?
A. That's correct.
Q. So, the major criteria really is and comes down to that issue you mentioned before, loss of control, which implies it's hard to quit. That's exactly what you wrote in your expert report, right?

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A. Yes.
Q. And that hasn't been any secret, has it? That it may be hard to quit?
A. No; that's not a secret.
Q. Dr. Henningfield, he's a respected researcher in this area, isn't he?
A. Yes.
Q. He's been a collaborator of yours?
A. Yes.
Q. Hadn't Dr. Henningfield said that clinical aspects of quitting, tobacco withdrawal, if you will, are very mild quote unquote compared to other substances?
A. Well, I think he's referring to the medical aspect of withdrawal.
Q. Is that what he said though, would you like me to display the article or do you recollect that?
A. I recall, but from what you read to me, I mean, I know Dr. Henningfield very well. I know what his opinions are. And I know that he understands that some people, some people's lives are severely disrupted by tobacco withdrawal.
And so whatever he says there, that's not what his current thought is. I can tell you I talk to him frequently.
Q. But you don't doubt that he has written

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that

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withdrawal, if you will, is very mild compared to withdrawal from opiates, sedatives, and alcohol?
A. Well, clearly. And I agree with him if you are talking about from a medical perspective, you have to hospitalize someone for nicotine withdrawal, no. Do you have to hospitalize someone for barbiturate withdrawal or alcohol withdrawal? Yes.
That's where it's much different, the nature of it is different. But the disruption is not necessarily different. Some smokers can't work for months because they can't concentrate on their jobs. That's pretty major.
Q. Take months off work?
A. Not necessarily, but I can tell you people who are writers, who have always smoked a cigarette when they write, and then they stop smoking and they can't concentrate on their job, they can't write, they can't focus, they pace around, they can't get going again, and they relapse to smoking because they need to work their job.
That's an example of a severe disruption that occurs. And people know that they shouldn't be smoking, but they need to smoke to do their job, and that's severe.
Q. I don't mean to make little of that example, doctor. But isn't it fair to say that writers for centuries, as

1794

long as people have been writing, have been looking at excuse for writer's block. It's always something. It's the noise in the apartment upstairs. It's just I just quit smoking; it's I can't get coffee?
A. Well, that's probably true, but there are other people who have problems concentrating on their jobs. Especially when they have been using, when they have been smoking with their work for a long time and have

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trouble
9 focusing for quite a while after they stop
smoking.
10 I don't think. So, it should be a
trouble with
11 job performance is an important reason why
people relapse
12 to cigarette smoking.
13 Q. Let me finish up this area between
similarities
14 between smoking and other behaviors.
15 One other difference between smoking
and some
16 of these other things you have mentioned is
that our
17 society treats the cigarette as a legal
product, correct?
18 A. Yes.
19 Q. You mentioned that on direct; didn't you?
20 A. Yes.
21 Q. And it's not only legal to market and for
people to
22 buy, but it's legal to advertise and sell as
long as it's
23 got the congressional warnings on it?
24 A. Yes.
25 Q. And even more government here has chosen
to make

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1 cigarettes a revenue source?
2 A. Yes.
3 MR. COUGHLIN: I object, your Honor.
4 THE COURT: You mentioned the cost
of smoking
5 earlier.
6 MR. COUGHLIN: I didn't mention
about the cost.
7 Were looking '58.
8 THE COURT: It's beyond the scope of
the
9 direct. I don't know how far you were going to
go on
10 this.
11 MR. WEBER: I just had two more on
this.
12 THE COURT: I'll permit it other
than fly the
13 witness back from California for the
defendant's case.
14 BY MR. WEBER:
15 Q. Do you know that here in Ohio that we have
state tax
16 on cigarettes?
17 A. I assumed Ohio did.
18 Q. And it finances public works, stadiums,
it's one of
19 the primary sources here?
20 A. I don't know what it's used for.
21 Q. But that's a difference in the way society
treats
22 smoking and cigarettes, correct?
23 THE COURT: That's three questions.

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MR. WEBER: Okay, I withdraw that one.
Q. Now, are you aware that even before the report you

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worked on, the '88 report came out, doctor, that there was,
there were some statements Dr. Koop had made to the media,
to the press in which he expressed his personal opinion
that smoking was addictive?
A. I know there were press releases. I don't recall
specifically which ones you are talking about.
Q. And do you, do you know that at different, well, let
me strike that. Let me ask you if you have seen this, this
is Exhibit AIW 1287.
And this is a document the government of
Canada, the Canadian, from the Canadian Director General
Drug Director; do you see that?
A. Yes.
Q. And the date on this document is, if we look at least
on the stamp there, May, 1986?
A. Yes.
Q. And it references how in this middle paragraph how
Surgeon General Koop?
MR. COUGHLIN: I object, your Honor; this is
hearsay.
THE COURT: I'm not sure what the question is.
MR. WEBER: I'm not offering it for the truth,
your Honor. I'm offering it solely for the fact that the
expression by Dr. Koop, his opinion was not universally
accepted. I'm not arguing about what the substance was

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either way. Simple for the fact it was said.
THE COURT: I'll deny the objection. And I
instruct the jury it's not offered for the truth. It's
offered for the issue as to whether or not -- it's not
offered to the truth at whether smoking is addictive. It
is offered for the truth there is some debate on the
issue.
BY MR. WEBER:
Q. And does this indicate to you, Dr.

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Benowitz, that
there was at least some dispute at least in 1986 among some
people in the field as to whether addiction was the proper
word to characterize smoking?
A. Yes, this really relates to the same thing we talked
about before, about whether the addiction should include
intoxication and life threatening withdrawal symptoms.
Q. Now, and would you say it's fair to say that, at
least as of 1986, reasonable people could have a difference
of opinion as to whether or not addiction was the proper
term to characterize smoking?
A. Well, as you said before, the behavior was never
questioned. Some people felt that addiction requires
intoxication and withdrawal. Some people think dependence
is a better term. From my point of view, it doesn't really
matter at all everyone understand what addiction means,
they understand the loss of control of issue. I think it's

really moot in terms of what it's called.
Q. Isn't it fair to say, doctor, and you have said
before, that the science is out there, and has been, and
the precise name you put on it isn't the issue as long as
you recognize that smoking can be difficult to quit?
A. That's correct.
Q. And are you familiar that the President of the
British medical association, even in 1996, has expressed
the viewpoint that he doesn't accept the notion of
addiction; he doesn't use that term?
A. I'm not familiar specifically with that.
Q. It wouldn't surprise you though, would it?
A. No.
Q. Because scientists can in good faith still disagree,
they may accept the behavior, but they still disagree about
the precise term used to characterize the behavior, fair
enough?
A. There are some scientists who like dependence better,
but I think the terms, both terms are well

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understood.
Q. Indeed, Dr. Benowitz, isn't it true that even after you were the editor of the 1988 Surgeon General's report that used the word addiction, even after that, you yourself expressed the position that you would stay away from the term addiction before a jury or at a trial because it was such a loaded term; haven't you said that? Even after the

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report?
A. I'm not sure of the exact words, but I believe that that I've even changed my own view over time from the point of view that the addiction concept carries information about the strength of the behavior. Sometimes dependence doesn't do that.
Now, I do agree that it has to be qualified, and if I say something is addicting I don't want someone to think I'm talking about anti-social behavior or anti-intoxication or severe withdrawal symptoms.
But I want to communicate the strength of the behavior. And I think that in some cases it's actually the public understands it better as addiction than dependence.
I don't doubt that I said what you said I -- what you say, but now I don't hold that exact view. I think I would change it slightly.
Q. But you acknowledged that in 1989, after you worked on the Surgeon General's report, you testified that you wouldn't use the word addiction in front of a jury because it was a loaded and confusing term, correct?
A. I'm sure I did. I'm sure you have my testimony.
Q. Would you like to see it?
A. I believe you.
Q. Now, and it's true that different people understand

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the word addiction to mean different things, correct?
A. Yes and no. I think people generally

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understand
addiction to deal with loss of control over some behavior,
in terms of public understanding or general understanding.
Q. When you say loss of control, what you mean is hard
to quit, hard to abstain?
A. Or hard to change, whatever it is.
Q. And indeed lay people, people on the street, people
like me with no scientific training, other people, they
refer to lots of things as addictive now, don't they?
A. Yes.
Q. You hear about exercise, you hear about people a
addicted to gambling, shopping, golf, whatever, video
games, right?
A. Yes, what I think is important though is separate out
compulsive behaviors, which is what you are talking about,
from drug addictions because drug addictions are specific
things maintained by different drugs.
And it's different from exercise addiction or
love addiction. It's different than whatever one does in
their life. Again, I come back to no one ever needs to
have nicotine in their body. Once they get it, they have
a hard time doing without it. That's the issue for drug
addiction.
Q. So, at least there is a lot of confusion out there

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about the term addiction, correct?
A. I don't think there is confusion. I think most
people understand you are talking about a compulsive
behavior.
Q. Something hard to quit?
A. Yes.
Q. And even then, not only could you, in 1989 say that
it's too loaded a term, you preferred not to use it, but to
use other terms, other people can hold that viewpoint
reasonably too, correct?
A. Sure.
Q. Even today?
A. Yes.
Q. Now, let me move to a different topic now if I could.

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Talk about, I want to talk about some of the cigarette design issues you addressed on direct and some of the documents from my client R.J. Reynolds, all right?
A. Yes.
Q. Now, you talked about reduction in tar and nicotine over the years; did you not?
A. Yes.
Q. And let me show you page 88 from the 1989 Surgeon General's report. I'm just trying to see if I can get another l latch on to help that at all. Does that help or make it worse. Worse? Okay. I think you are right?

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A. I can see it.
Q. Can you see that all right, doctor?
A. Yes.
Q. If not, you might want to look over there on the right or you can, I'll hand you a piece of paper?
A. I know this figure well.
Q. Now, what this does, in the Surgeon General's report, is it talks about different design changes over the years, correct?
A. Yes.
Q. And the effect on tar and nicotine, tar being the top line, nicotine being the bottom, correct?
A. Yes.
Q. And it shows how they have gone down over the years, correct?
A. Yes.
Q. And among the factors cited by the Surgeon General as having an effect on that, are reconstituted tobacco?
A. Yes.
Q. Porous paper?
A. Yes.
Q. Expanded tobacco?
A. Yes.
Q. And ventilation, correct?
A. Yes.

1803

Q. And these numbers here, by the way, these are sales weighted numbers, correct?
A. Yes.
Q. And isn't that the way that researchers often look at the drop in tar and nicotine as a sales weighted

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average?
A. Yes.
Q. And sales weighted average, what that means, doctor,
is not that all cigarettes are on the these lines, but that
there are some above and some below, correct?
A. Yes.
Q. And this line gets plotted where it is, based on the
number of sales that are made for middle, high or low
delivery cigarettes?
A. Yes, although it's, it's done with a specific yield
numbers; but yes, the idea is correct.
Q. And, for example, you know as a researcher in that
area, that in this period moving into the late 80's, et
cetera, there are some cigarettes that are sold with
measured yields down near the bottom, correct?
A. Yes.
Q. But they are not reflected on this because that's a
sales weighted average?
A. Right.
Q. Would you agree with me that the numbers on a sales
weighted average are determined not only by what cigarettes

are in the marketplace but what consumers choose to buy?
A. Yes.
Q. And if consumers choose to buy a lot of high tar,
that number goes up, and if they choose to buy low tar,
doctor, that number goes down?
A. Yes. It depends on what they choose to buy.
Q. And there have been sales way down low and at the
bottom, and if consumers buy with a lot of tar, and the
consumers buy large amounts, those would go back up?
A. I understand they don't buy a large amount.
Q. I understand your understanding of the FTC method,
good method or not. Right now, I want to accept the
measurements on that and ask some questions, okay?
A. Yes.
Q. I'm sorry, you would agree that reducing tar and
nicotine as a design matter was encouraged by our

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government and by the public health community, correct?
A. Yes.
Q. And in your opinion, as well, those were right minded efforts, generally, correct?
A. Yes.
Q. And you would agree that smokers who did not or would not quit, would be well advised to smoke lower yield cigarettes, correct, if they didn't or wouldn't quit?
A. Yes, I think they should, I think they should be told

1805

how not to oversmoke them, but yes, they should smoke lower yield cigarettes.
Q. And these design measures we saw here, that brought about these reductions, those were all put in place as inventions by the American cigarette industry, correct?
A. Yes.
Q. And you give the companies credit for those inventions, don't you?
A. Yes.
Q. You don't think they are wasting their time, correct?
A. No, I think they could be more effective if they told consumers how to make use of them properly, but I don't think it's a waste of time.
Q. Indeed there is even one invention on here that had a big impact that didn't even make the Surgeon General chart, correct, filters?
A. That's right.
Q. And that brought that line down even more, correct?
A. Yes.
Q. Now, and you know that there have been reports in the published scientific literature, 70's, 80's, even 90's, doctor, that say that reduced delivery cigarettes do in fact reduce risk. Those publications have been out there, correct?
A. Referring mostly to comparisons of filter versus

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non-filtered cigarettes, not with respect to the range of modern cigarettes.

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Q. But the reports are out there that reduce -- deliver reduced risk, correct?
A. You have to be specific about this. You are talking about reducing numbers in the '50's. You could have tar numbers of 40 milligrams and nicotine numbers of almost 3 milligrams.
And then when you add filters, you are still dealing with cigarettes that are quite high compared to modern cigarettes with a lower risk. I've never seen any data comparing when filter cigarettes -- that lower these numbers had made any difference.
Q. There is epidemiology on that is going on right now; is there not?
A. Yes.
Q. And the Surgeon General in 1981 concluded that the risk of lung cancer had decreased because of cigarette design modification, correct?
A. Yes, again due to filtration.
Q. And the Surgeon General concluded at the time that not only had the amount of tar been decreased, but that the toxicity of tar on a gram per gram basis had decreased, correct?
A. Yes.

1807

Q. So that what he concluded in 1981, was not only was there less tar, but if you put aside the less issue, just look at the tar itself; it was less toxic to animals on the animal studies, right?
A. Yes.
Q. Now, you are familiar with the work of Dr. Michael Russell, correct?
A. I am.
Q. He is a pioneer, as you have said, in the study of nicotine addiction?
A. Yes, and a personal friend.
Q. And he is one who has written for decades on addiction?
A. Yes.
Q. And he's firmly convinced that smoking is addictive, correct?
A. Yes.

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Q. Now, Dr. Russell has made any number of suggestions over the years in published peer review literature about what ought to be done in designing cigarettes, correct?
A. Yes.
Q. And he has examined cigarette design issues; has he not?
A. Yes.
Q. And are you familiar with a statement by Dr. Russell

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that was given at the Second European Council, Smoking and Society in 1978, in which Dr. Russell said, at the risk of being hounded out of the conference, I'm going to suggest that over the past 20 years the tobacco industry may have achieved more in reducing smoking related disease than we have. This is because they focused their efforts on making cigarettes safer?
A. No; I've never seen that quote before.
Q. Now, one factor of significance in cigarette design is whether or not smokers will accept the product, correct?
A. Yes.
Q. Reynolds learned that with Premier. They didn't accept it, right?
A. Yes.
Q. So, unless the government is to come in and say that only one cigarette or one type of cigarette or one set of cigarettes can be made, the success of a new design will depend on whether or not consumers want them?
A. Yes.
Q. Now, there are some governments that have put restrictions on how cigarettes can be designed, right?
A. Some governments have put restrictions on upper limits of yields.
Q. We haven't done that here yet?
A. No.

1809

Q. Now, on the FTC method, you mentioned that it never was intended to reflect an actual human smoker?
A. Not an individual smoker.
Q. Not an individual smoker and the FTC informed the

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public of that with the announced the test as being
required?
A. Yes.
Q. And the tobacco companies had written to the FTC as
part of that process, telling them that just in case the
FTC didn't know it itself, right?
A. Right. But I have to say it was intended though to
give some idea of relative exposure for different kinds of
cigarettes for populations of smokers, and that's why it
was developed.
Q. And indeed you are familiar with the independent
committee on smoking and health in England?
A. Yes.
Q. The so called Froggatt Commission, Hunter Commission,
whatever?
A. Yes.
Q. That commission requires what they call league
tables, L-E-A-G-U-E?
A. Yes.
Q. And what the league tables are the same thing as our
FTC numbers here?

1810

A. Yes.
Q. They require publication of those numbers, correct?
A. Yes.
Q. And they have said that while there is a lot to
criticize about those numbers, nonetheless they give them
information to consumers on relative rankings from top to
bottom, right?
A. Yes.
Q. And you know that the companies here in America are
required to put those FTC test numbers on each and every
advertisement they have?
A. Yes.
Q. That if they didn't do that, they would be violating
the law?
A. Yes.
Q. They are not free to come up with some new tests?
A. Correct.
Q. Themselves?
A. Correct.
Q. In other words, if you had went in a dark room with
some scientist and came out a month later with

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an
22 absolutely perfect test that no one in the world could
23 criticize, they still couldn't use it until the government
24 said they could; is that right?
25 A. That's correct.

1811
1 Q. There were meetings what back in '94 on the FTC test
2 method? You were an invitee in that?
3 A. Yes.
4 Q. Along with some of the scientists from R.J. Reynolds.
5 A. Yes.
6 Q. And the pluses and minuses of that FTC method were
7 discussed in 1994 by various people at that conference?
8 A. Yes.
9 Q. And FTC has not yet changed that method, has it?
10 A. That's correct.
11 Q. Now, in the 1970's, some researchers began to suggest
12 that it didn't make sense to keep reducing both tar and
13 nicotine, correct?
14 A. Yes.
15 Q. And indeed what some researchers suggested was that
16 tar reduction ought to continue, but nicotine reduction
17 shouldn't, right?
18 A. Yes.
19 Q. And the theory underlying that was a public health
20 theory, correct? The theory was that whatever disease came
21 from cigarettes largely came from the tar, correct?
22 A. Yes.
23 Q. But that people tended to smoke because of the
24 nicotine. That was the theory, right?
25 A. Yes.

1812
1 Q. So, the theory was to produce cigarettes that had
2 a certain level of nicotine and keep reducing the tar?
3 A. Right.
4 Q. And that's called, I mean, there are many things you
5 can call it. One thing it's called is breaking the tar to
6 nicotine ratio, right?
7 A. You could call it that.
8 Q. Okay. In other words, they were reducing the level
9 of tar per unit of nicotine?

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A. Yes.
Q. Premier was an example of a cigarette like that,
right?
A. Yes.
Q. You actually agree with that concept, correct?
A. Yes.
Q. And Dr. Russell was one of the ones who wrote and
spoke about that, correct, this issue of maintaining
nicotine and limiting tar?
A. Yes, he, he advocated it a lot. Actually, my own
point of view is somewhat different than that in terms of
what I think policy should be for the future.
I think in fact nicotine should be reduced
gradually over time to make cigarettes not addictive but
that nicotine be made available to people in other sources
so they don't to over smoke cigarettes.

1813
Q. Your position, to be fair, doctor, is that the
government ought to regulate the level of nicotine and
limit it to a very, very narrow range and require it to be
reduced over time?
A. Yes, I think based on what's known about addiction
that cigarettes should be non-addictive so that people
really do have a choice as to whether to smoke or stop
smoking.
Q. So, your position the Government should limit what's
legal to sell for cigarettes and over time the nicotine
ought to be removed completely, right?
A. Not completely. I think it should be brought to the
point where cigarettes are available, but they are not
addictive, and that nicotine for people who are addicted
should be provided in safe forms that don't cause serious
disease, and that that should be coordinated by a health
agency, such as the Food and Drug Administration Drug
Administration that could really assess the policy over
time, make sure that it's doing what it's supposed to do,
make sure it's not having any adverse affects

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and regulate
21 it, just like it regulates other drugs.
22 Q. And is it part of your vision of the future if it
23 were up to you that cigarettes would be available only by
24 prescription?
25 A. No, not necessarily. I think that cigarettes should

1814
1 just not be addictive, and so people can really when they
2 want to stop smoking, can stop smoking. That's the choice
3 that I want the smoker to have.
4 Q. Well, people can stop smoking. You have told us that
5 earlier. You just want to make it easier for them?
6 A. Yes.
7 Q. Is that fair?
8 A. I would like to make it so that people who have a
9 heart attack and should stop smoking more than 50 percent
10 can stop smoking.
11 Q. Have you done a study on how many people after heart
12 attacks stay away from red meat, eggs, butter, olive oil?
13 A. No.
14 Q. Now, you know that these recommendations that came
15 from the public health community about maintaining nicotine
16 and reducing tar, those were researched by these companies,
17 weren't they?
18 A. Yes.
19 Q. They were researched by people outside the companies
20 and by people inside the companies, correct?
21 A. Yes.
22 Q. And that was a reasonable and responsible for things
23 for these companies to do to do research along that
24 recommended line, right?
25 A. Yes.

1815
1 Q. Now, on direct exam, you talked about a memorandum
2 the ladies and gentlemen of the jury have seen several
3 times before. And that was a memorandum by Claude Teague
4 about the crucial role of nicotine, right?
5 A. Yes.
6 Q. You remember discussing that on direct?
7 A. Yes.
8 Q. And this memorandum was, it's got a date

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of 1972; do
you see that?
A. Yes.
Q. Now, did, and Dr. Teague expressed a view some point in here, he said somewhere that if nicotine is the sine qua non of tobacco, then certain things follow, correct?
A. Yes.
Q. And he then went on, he said he didn't have data, but he then went on to suggest maintaining nicotine at a certain level and continuing to reduce tar, correct?
A. I've seen different ones of his documents. I don't remember. I would have to take a look at it to confirm what you said.
Q. Okay. For example, he says, and again, there are a lot of ifs here, but let's start on the top one. If our business is fundamentally that of supplying nicotine in useful dose form, why is it really necessary to have allegedly harmful tar accompany it?

There should be a legal way to do it.
A. Yes.
Q. And down below, I know it's hard to read this, with the production here. He says, it should then be possible using modifications, et cetera, to deliver the nicotine to the user in efficient and effective attractive doses accompanied by no tar; correct?
A. Yes.
Q. What he's talking about here, he's saying if the reason is nicotine, the reason people smoke, we ought to be researching reducing tar, maintaining some level of nicotine, correct?
A. Correct. He does state in that document in some places strongly that because if nicotine is why people smoke, but I do agree with what you have just said now.
Q. And he refers on the first page, doesn't he, doctor, to the habituated user?
A. Yes.
Q. Okay. And he does also say, just so we are clear, he

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20 does say if nicotine is the sine qua non of tobacco, right,
21 in that portion?
22 A. He says different things, and without having the
23 whole document I can't put this in proper balance, in terms
24 of when he says nicotine definitely is and when he says
25 if -- it's hard to comment where you have shown me just one

1817
1 sentence.
2 Q. Just so we all know, sine qua non, without getting me
3 in my attempt to translate Latin, that is the essential
4 element, without which you would not have such a thing,
5 correct?
6 A. Yes.
7 Q. You looked at a number of Dr. Teague's documents?
8 A. Yes.
9 Q. And those were provided to you by counsel in this
10 case or some other case, correct?
11 A. Yes.
12 Q. Have you reviewed Dr. Teague's depositions?
13 A. No.
14 Q. Would it be of any interest to you whatsoever, any
15 interest to know what Dr. Teague himself has had to say
16 about this document, what he was thinking, and what he was
17 doing at that time?
18 A. I would be curious. I think his statements are
19 pretty clear. But I'm interested just because I have read
20 so many of his statements. I would be interested to know.
21 Q. You would be interested to know what Dr. Teague
22 himself had to say?
23 A. Yes.
24 Q. And you weren't provided that deposition in this or
25 any other case?

1818
1 A. No.
2 Q. Do you know how many deposition he's given?
3 A. I have no idea.
4 Q. To your knowledge, was Dr. Teague a nicotine
5 researcher?
6 A. I think he was involved with research direction. I'm

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not sure whether he was a researcher or not himself.
Q. So, it wouldn't surprise you to find out Dr. Teague never had done research on nicotine?
MR. COUGHLIN: I object. If he has a question for Dr. Teague, he can bring them in.
MR. WEBER: I have a good basis for this question; it is cross.
MR. COUGHLIN: I don't think so, your Honor.
THE COURT: Well, I'll ask you to rephrase the question.
MR. COUGHLIN: He, if he's got anything Dr. Teague said, he can bring him in and we can all see him.
MR. WEBER: I'm not asking what Dr. Teague said.
THE COURT: He's answered the question. Were you going to need to rephrase. He's answered generally what interest he would have in terms of his position.
Q. Now --
THE COURT: If you want to rephrase the

question.
BY MR. WEBER:
Q. I'm sorry, judge. I didn't mean to talk over you.
With this fan here I have a hard time hearing sometimes.
Do you know whether Dr. Teague was or wasn't a behavioral scientist?
A. I don't know anything about Dr. Teague other than his position as a research director.
Q. And do you even know that was his position, research director?
A. I don't recall the exact title. But I think he was involved in research direction of some sort.
Q. To be fair, you don't know his title?
A. You know, I have heard his title before. I have read it before. But I've forgotten it because there are so many different documents and titles.
Q. And you don't know whether he fit in the hierarchy of the Reynolds research department?
A. That's correct.
Q. Or whether he supervised anyone or not?

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A. That's correct.
Q. Now, would you agree with me that this memorandum of Dr. Teague that you talked about on direct, contained within it no scientific experimental results or data points?

1820

A. Well, as I recall, I'm not looking at it now, but as I recall, it was really his interpretation of the science.
Q. And you think that Dr. Teague was right, that his proposals that we have been talking about, about reducing tar and maintaining a level of nicotine, you think that was a sensible recommendation?
A. Depending on the goals, but within the framework, framework of conventional cigarettes, I think it was reasonable.
Q. And it's fair to say, and you would agree, wouldn't you, that Dr. Russell would probably agree with the ideas Dr. Teague and recommendation he's making there?
A. Yes.
Q. And these ideas that Dr. Teague is talking about here, are essentially the same thing that Dr. Russell and others were saying in the literature during the same time period, right?
A. Yes.
Q. And indeed, this 1981 Surgeon General's report recommends this very same kind of research, doesn't it?
A. Yes.
Q. Let me show you this from page 185 and 186 of the 1981 Surgeon General's report, doctor, get you down at the bottom here.
A probable outcome of the behavioral research

1821

will be that nicotine is the primary pharmacological reinforcer for cigarette smoking.
It says probable outcome?
A. Yes.
Q. It almost makes it sound like nicotine is a sine qua non?
A. Yes.

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Q. It says, if this prediction is correct, a lower tar and nicotine cigarette that will be used by smokers that will minimize the exposure to other toxic exposure to other toxic components of smoke may require substantial yields of nicotine?
A. Yes.
Q. And that's the same thing Dr. Teague's talking about?
A. Yes.
Q. And Dr. Russell and others were talking about at that very same time?
A. Yes.
MR. WEBER: I'm moving to a slightly different topic. I don't know what the court's --
THE COURT: I've got to sentence someone at 12:30, so why don't you take about 10 minutes.
MR. WEBER: Ten more minutes?
THE COURT: Yes.
Q. Now, you are familiar with the literature that's out

there in the scientific published literature about using research on smoke pH as a means of maintaining nicotine impact while reducing tar, are you not, sir?
A. Yes.
Q. In other words, the theory is, in the published literature, that it might be a good idea to research design methods that maintained nicotine impact in the mouth and throat but had a lower tar cigarette?
A. Yes.
Q. And again, the theory on that is the same one we were talking about a moment ago, theory was to keep nicotine at some level, reduce tar?
A. Yes.
Q. And the reason that theory came out, keep nicotine at some level reduce than tar is, because it was felt to be consumer acceptable a cigarette had to have some level of nicotine?
A. Yes.
Q. And Philip Morris learned that the hard way, they sold the Next cigarette and it was a big failure, the de-nicotined cigarette?
A. I suppose you could say that I'm not sure

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why they
23 marketed the Next or what they tried to do with
it, but it
24 did fail.
25 Q. And, you know, when Philip Morris marketed
a

1823
1 cigarette that had no nicotine, they were
criticized by the
2 public health community as well, correct?
3 A. I don't recall that. It's possible, I
just don't
4 recall it.
5 Q. Now, are you familiar with the Elson &
Betts article
6 from the 1972 Journal of the National Cancer
Institute?
7 A. Which one is that.
8 Q. It's an article entitled, sugar content of
tobacco
9 and pH of smoke in relation to lung cancer risk
of smoking?
10 A. Yes, I have read that.
11 Q. And that's in the Journal of the National
Cancer
12 Institute '72; that same year of the Teague
memo, correct?
13 A. Yes.
14 Q. And one of the suggestions made in the
Elson & Betts
15 article was that by adjusting pH one could
affect the risk
16 of smoking, correct?
17 A. Yes.
18 Q. And articles at that time talked about one
method of
19 changing pH being a method in which alkaline
substance goes
20 were added to the tobacco, correct?
21 A. Yes.
22 Q. And alkaline substances would include
ammonia?
23 A. Yes.
24 Q. Anything else that's basic?
25 A. Yes.

1824
1 Q. And you are familiar also with an article,
I take it,
2 in Science, in 1976 -- Science, by the way, is
one of the
3 world's leading scientific journals is it not?
4 A. Yes.
5 Q. Low risk cigarettes, a prescription?
6 A. Yes.
7 Q. And you are familiar with this article
where it
8 talked about the very theory that you have been
talking
9 about today? And it was expressed in some of
these
10 memoranda of Dr. Teague and others you have been

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looking
11 at.
12 It says, within certain value ranks high levels
13 of nicotine, high smoke pH values, and high ratios of
14 unprotenated nicotine -- let's stop right there. But you
15 mentioned that quickly on direct, unprotenated nicotine is
16 free nicotine?
17 A. Correct.
18 Q. Protenated is the bound nicotine, or the kind that
19 appears and remains in the particle?
20 A. Yes.
21 Q. Fair enough.
22 Notes that high level, high smoke pH increases
23 cessation effects in the smoke, depth of inhalation, et
24 cetera.
25 Do you see that?

1825
1 A. Yes.
2 Q. And it goes on to say, thus, it appears that the
3 hazards of cigarettes can be reduced by a simultaneous
4 reduction of tar and, among other things -- and then we get
5 down to the last line where it goes -- and by an adjustment
6 of nicotine levels and protenation conducive to consumer
7 saying satisfaction.
8 What they are saying, there is an association
9 between free nicotine and bound nicotine?
10 A. Yes.
11 Q. And same in the Dr. Teague memo and some of the other
12 company memos you were shown?
13 A. Yes.
14 Q. And this was from the doctor running the National
15 Cancer Institute Less Hazardous Cigarette Program, correct?
16 A. At that time, that's correct.
17 Q. And it was reasonable, was it not, even responsible
18 for the companies to follow up on suggestions for that kind
19 of research, Dr. Benowitz?
20 A. Yes, that's reasonable.
21 Q. And you don't criticize them for doing that research?
22 A. No.
23 Q. And when you put some of those documents in front of
24 the jury today, you didn't mean to criticize them for

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engaging in that research?

1826

A. No, it's not engaging in the research. My comments were that the industry was functioning like a pharmaceutical company doing specific research on controlling nicotine levels and nicotine effects.

Q. And that was precisely the type of thing that was being recommended, right?

A. Yes.

Q. As a matter of fact, if they hadn't done it then they ought to be criticized for that, right? The Journal of National Cancer Institute says to do it. If these officials say to do it, if Dr. Russell, who's a leader in this area, if they are recommending this all around the world, if this industry, if these companies didn't do that, they ought to be criticized for that?

A. I agree it is research they should have been doing.

Q. Now, let me show you -- you know Dr. Dietrich Hoffman as a researcher in this area?

A. I do.

Q. A leading person in the area of analytical chemistry, et cetera?

A. Yes.

Q. Knows probably as much about tobacco and tobacco smoke as almost anybody?

A. Yes.

Q. Been in the areas area for years and years?

1827

A. Yes.

Q. You are familiar, and you would find him a reliable source with respect to data regarding the pH of tobacco smoke?

A. Yes.

Q. Indeed that's one of the areas he studies, right?

A. Yes.

Q. Dr. Hoffman has written chapters, has been the primary author of chapters in Surgeons Reports, hasn't he?

A. Yes.

Q. Now, this is an article in the Journal of Food and Cosmetic Toxicology from 1974, okay?

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13 A. Yes.
14 Q. It says that way up there, but I'm not sure either
15 one of us could read it, so would you accept that?
16 A. Yes.
17 Q. And this is Exhibit AS 863.
18 And what Dr. Hoffman found then, was that
19 cigarettes made from bright tobacco and blended tobacco
20 deliver mainstream smoke at a pH below 6.2, correct?
21 A. Yes.
22 Q. And consequently, contains only small amounts of
23 unprotenated nicotine, right?
24 A. Yes.
25 Q. And unprotenated nicotine is the free nicotine?

1828
1 A. Right.
2 Q. And would you tell, getting into this in any detail,
3 the amount of free nicotine versus the amount of bound
4 nicotine, and the effect of pH on that is determined
5 mathematically through a curve, correct?
6 A. Yes.
7 Q. That's called the Henderson Hasselback equation?
8 A. Yes.
9 Q. If you know the pH, you use mathematical formula to
10 tell you how much to use on this side and how much on the
11 other.
12 A. Yes.
13 Q. And at 6.5 there is virtually no nicotine, correct?
14 A. Gets a little tricky when you are talking about
15 virtually none, because it depends how much you need for an
16 effect. There may be a relatively small amount, but if
17 it's a very potent effect, there is a ten times
18 differences, say, from going to 6.1 to 6.2, 3, 4. A small
19 difference could make a big difference in the nicotine
20 amount.
21 Q. You know that the Surgeon General said below 6.5
22 there would be virtually none put aside?
23 A. Virtually none is a concept you have to interpret.
24 If you are talking about how much is there compared to in
25 particles, the answer is a very small amount. If you are

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1829

saying is there enough to have biological activity, the answer may be different.
Q. That would be the mouth and throat effect that the free nicotine has, correct?
A. Correct. And brain wave effects, that's something we haven't talked about, but actually there are studies from Philip Morris showing that changing pH of cigarettes, higher pH effects, causes greater brain wave effects on smokers.
Q. But in terms of what you have talked about, what you presented to the jury on direct, the effect of the receptors, that's not the effect we are talking about here, correct, what you talked about on direct?
A. Well, that's a good question. That's one of the mechanisms that's not resolved in terms of why higher pH causes brain wave activation. Could it be faster absorption or involving sensory nerves? That was one of the questions, actually, that I have observed.
Q. That question about whether it gets there faster, you have said just recently, is a theory. You are skeptical though, correct?
A. Right. But my point here is there is observation that is made, and the question is what explains it? I don't have the explanation. There have been two explanations offered.

1830

One is faster absorption, and one is inter stimulation. I don't know what.
Q. And there might be others some day?
A. Those are the two that makes sense. My point, is the observation is made that high pH cigarettes do affect the brain differently than lower pH cigarettes. I'm not sure how, but they do.
Q. But what you do know now is that the free nicotine affects the mouth and throat and has that impact, correct?
A. Yes, yes.
Q. Now, what we talked when we talk here,

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when Dr.
Hoffman talks here about cigarettes, bright tobacco and
blended tobacco, those are American cigarettes, correct?
A. Yes.
Q. Now that was 1974, correct?
A. Yes.
Q. Dr. Hoffman looked at that issue some years later,
didn't he?
A. I'm sure he has.
Q. And if I could show you, Dr. Hoffman's article, The
Changing Cigarette, and this was published in the Journal
of Toxicology in 1997?
A. Yes.
Q. All right. And Dr. Hoffman checks these pH numbers
over the years, correct?

A. I'm not sure what he does.
Q. Here he is, in 1997, publishing the pH made with flue
cured tobaccos with American blends ranged from 5.7 to 6.2.
Do you see that?
A. Yes.
Q. And 6.2 was the number he found 25 years ago,
correct?
A. For those cigarettes he looked at, yes.
Q. So with respect to the data from Dr. Hoffman, we see
no substantial material continuing increase or change in
pH, correct, based on this table?
A. Well, let me say, these are sort of summary sentences
and I have not seen his data year by year of pH's of
cigarettes. So I'm reluctant to say that he's making the
statement that you imply, that pH levels have stayed the
same over the years. I would need to look at the data he
has for that. This is really a summary for saying pH is
about this.
Q. Well, but if we accept, without me characterizing, I
won't characterize it, but if you accept what Dr. Hoffman
said, the language he chose, not the language I chose, the
language he chose and the numbers he chose, and compare his
1974 article to his 1997 article, you see no change in the
upper limit, correct?

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25 A. He's not --

1832

1 Q. Is that true?
2 A. He's not talking about specific cigarettes. And when
3 he's making a generalization of how cigarettes are made and
4 what the pH usages are, he's not saying these are the ones
5 that have altered sugar content or altered ammonia content,
6 or what. I don't interpret this the way you do, I
7 interpret this as a general statement for certain kinds of
8 tobacco blends; this is what the pH range usually is, but
9 not specific data saying it's been this way over X number
10 of years.
11 Q. Would you at least agree that when Dr. Hoffman chose
12 to write an article in 1974, and when Dr. Hoffman chose to
13 write an article in 1997, the language he chose and the
14 numbers he chose for the upper limit for the pH of American
15 cigarettes was 6.2?
16 MR. COUGHLIN: I object. He's been over this
17 and it's been asked and answered.
18 THE COURT: I think we understand the point.
19 We are going to take a lunch time break. In any case,
20 we'll stand in recess until five minutes until 1:00.
21 Same rules apply. Don't talk about the case
22 among yourselves, don't form any opinions, don't express
23 any. Five minutes until 1:00 be back in the jury room, or
24 actually at 1:00 o'clock be back in the jury room.
25 So we'll stand in recess until that time.

1833

1 MONDAY AFTERNOON SESSION - MARCH 1, 1999
2 THE COURT: If you will take your seat, I'll
3 ask Mr. Weber to continue. And I'll remind the witness
4 that you remain under oath from this morning.
5 THE WITNESS: Yes.
6 BY MR. WEBER:
7 Q. Thank you, your Honor, good afternoon, ladies and
8 gentlemen.

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9 One more question on psychoactive. I can't
10 resist. How about getting real cold? Does that increase
11 psychoactivity?
12 A. It can certainly make you uncomfortable.
13 Q. Do you remember when we ended I had asked you some
14 questions about Dr. Hoffman's research and his publication
15 in, I think, 1974, and then his publications some 25 years
16 later in 1997, about pH levels?
17 A. Yes.
18 Q. Remember I asked you as part of that whether the
19 Surgeon General had said at a certain level of pH there is
20 virtually no nicotine?
21 A. Yes.
22 Q. And at that time it was my fault, I was unable to
23 pull the paper out of my collection. I just wanted to show
24 you this, Dr. Benowitz, if I could. This is from the 1989,
25 '79 report, I'm sorry. Page 14 dash 108 and ask you if

1834
1 that said 1979, that's since cigarettes in the United
2 States and most foreign countries are made of flue cured
3 and are blended with flue cured, the pH of the resulting
4 mainstream street smoke is 6.5, and thus essentially
5 contains only protonated nicotine; is that what it says?
6 A. Yes, but to get the full picture, if you go back to
7 the diagram in Hoffman's book or some other documents, it
8 shows the only, the percent of protonated and unprotonated,
9 the point I tried to make before and is still valid. Say
10 there is only a tenth of a percent that's in the base form,
11 but that tenth of a percent is a thousand times more active
12 than what's in the acid form, you could say that it is in a
13 sort of a total number of milligrams, it's essentially only
14 protonated but the small amount of unprotonated can have a
15 significant biological effect.
16 Q. Even a tenth of a percent difference?
17 A. All right. I'm saying if a tenth of a percent is in
18 the unprotonated form, even though that's a

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small amount,
and could be interpreted at the time as essentially only
protonated, if you talk about a biological effect if that
tenth of a percent is a thousand times more powerful than
the other stuff, it could be important.
And that's the problem with statements like
this. You really need to be precise in terms of how much
it is and what the biological impact is.

1835
Q. But at least that was the statement made by the
Surgeon General, correct?
A. Right. But this is misleading, if the conclusion is
that there is an insignificant effect. That's misleading.
He does say that it's essentially only protonated, but my
comment is, well, essentially is not a hundred percent and
that point one percent could be important.
Q. Now, we talked earlier about effect, do you remember
that about the free nicotine and the mouth and throat and
the impact?
A. Yes.
Q. Right now I'm asking you, you don't mean to change
any of that testimony, do you?
A. No.
Q. Right now I'm asking you, that's what the Surgeon
General said in '79, right?
A. Right.
Q. And again just for clarification sake, when that says
protonated nicotine, the protonated nicotine is the bound
nicotine. It's the nicotine you put in particles on your
drawing?
A. And the figure you showed me before, if you want to
see what essentially means, go back to the figure, and we
can read off the graph what essentially means. And we'll
know instead of using vague terms.

1836
Q. That's the Henderson Hasselback?
A. Yes.
Q. There have been further studies of pH by brand done
by independent laboratories?
A. Yes.

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Source: http://www.industrydocuments.ucsf.edu/docs/mrxd0001

Q. You are familiar with Dr. W. S. Bill Reichert; are you not?
A. Yes.
Q. Dr. Reichert indeed was one of the people who helped organize the Canadian expert committee that you were on and the Reynolds scientists were on?
A. Yes.
Q. Have you looked at Dr. Reichert's report from the Massachusetts Department of Health that deals with American brand cigarettes?
A. I have seen it.
Q. Let me put this up here then. This is for the record Exhibit AS 206. And I'm going to show you table 2 from, that's page 12 of Dr. Reichert's chart, okay? Let me get.
Now, I would like, I would like, doctor, if I could, to blow that up a little more and take that last column on the right off. But if you would rather that I have that on, I'll leave it there?
A. No; you can take that off.
Q. For pH we don't need that, do we?

1837

A. No.
Q. Now, these, this is Dr. Reichert's independent lab report on a variety of pH measurements on a variety of brands of cigarettes?
A. Yes.
Q. Now, with respect to Marlboro, pH of Marlboro is pretty much right there in the pack with everything else, isn't it?
A. Yes.
Q. PH of Marlboro Light is pretty much in the pack with everything else?
A. Yes.
Q. As a matter of fact, would it be fair to say, Dr. Benowitz, the pH of every single thing he measured is pretty much in the pack with everything else?
A. They are reasonably close, yes.
Q. And you have done no studies yourself, have you, that would enable you to say that any of these differences in pH would be perceived as different by a smoker, would you?
A. No. One could calculate the free

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nicotine, but I've
not done any experimental studies.
Q. Now, and again these, this is by an independent lab,
correct?
A. Yes.
Q. Using a consistent pH method?

1838

A. Yes. I mean, he works hard at trying to be as
consistent as possible.
Q. Now, you mentioned Dr. Russell, we talked about him
several times during the exam?
A. Yes.
Q. Let me show you what has been marked as Exhibit AS
196 and ask, this is a letter from the Institute of
Psychiatry at the National Addiction Center in London from
Dr. Russell, correct?
A. Yes.
Q. And it's to the Director of Research at R. J.
Reynolds, correct?
A. Yes.
Q. And Dr. Russell notes at the beginning that basically
saying I don't know you, but I've been interested in the
Premier cigarette, correct?
A. Yes.
Q. And he says, and I quote, I think the Premier has
tremendous potential for low risk, long term nicotine use,
and the response to it in your country was political and
irrational?
A. Yes, that's what he says.
Q. You know Dr. Russell, and that's the type of
viewpoint he's expressed in his writing, correct?
A. The first part is in terms of whether it's

1839

irrational. I'm not sure he understands what the issues
are in the U.S., but the rest of it is.
Q. Sometimes reactions are different in the UK than in
the U.S., right?
A. Yes.
Q. That's why they call us two people separated by a
common language. You have heard that one?
A. Yes.
Q. And then at the end of this --
MR. COUGHLIN: I object to all this; it is all

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hearsay.
THE COURT: Well, it's -- there is not a question right now.
BY MR. WEBER:
Q. And Dr. Russell says that he would be disappointed if a product with this potential were abandoned; do you see that?
A. Yes.
Q. Now, Reynolds didn't abandon that product, did they, and project?
A. Premier.
Q. And they took that technology and moved it to Eclipse, didn't they?
A. Yes.
Q. And they are continuing to work on that, correct?

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A. Yes.
Q. And that's just what Dr. Russell is recommending here, correct?
A. Yes.
MR. WEBER: That's all I have, your Honor.
Thank you very much, Dr. Benowitz.
THE COURT: Anyone else wishes to conduct an examination.

CROSS EXAMINATION

BY MR. BERNICK:
Q. Yes, I have a few documents, your Honor. Good afternoon, Dr. Benowitz. My name is David Bernick. I represent Brown and Williamson and British American Tobacco Company. I don't believe we have had the pleasure of meeting before.
A. Good afternoon.
Q. Good afternoon, ladies and gentlemen of the jury. I want to go back, Dr. Benowitz, to a period of time before 1964 when the Surgeon General's report came out. You have shown some documents from BATCo's files that were written before the Surgeon General's report came out, right?
A. Yes.
Q. And this one in particular, I think you showed this, was a memorandum that related to a meeting between Sir Charles Ellis, who was a consultant for BATCo, is that

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right?
A. Yes.
Q. And he was meeting with people from Batel which was a research institute in Europe, correct?
A. Yes.
Q. And what's pointed out here I think this is one of the documents that you pointed on out on direct examination, there is some reference to smoking being a habit and also has a strong indication of being an addiction; do you recall talking about that?
A. Yes.
Q. In point of fact, this memo actually relates to is research that was being done at Batel for BATCo, associated with a project called Ariel, correct?
A. Yes.
Q. And Ariel was a new kind of novel design cigarette, correct?
A. Yes, it is my understanding that it was something similar to what we have talked about recently, a cigarette that delivered nicotine without other toxins or with fewer other toxins.
Q. It heated rather than burning tobacco, correct?
A. Yes.
Q. And basically, BATCo was trying to develop this back in the early 1960's. And the purpose of the research that

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was being done by Batel, which was called Hippo One and Hippo Two, the purpose of that was to be able to develop research which showed the benefits of nicotine in order to get people to be interested in this new type of cigarette, correct?
A. Yes.
Q. Okay. So, this is basically research focused on the benefits of nicotine, true?
A. Yes, but I don't think you can separate the research on the benefits of nicotine from issues of why people smoke.
Q. I understand that, but that was the commercial purpose for doing the project to begin with,

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correct?
A. Yes.
Q. Now Hippo, there were two Hippo reports, Hippo One and Hippo Two. Do you recall that Hippo Two actually was research that tried to compare nicotine to the effects of a drug called Reserpine?
A. Yes.
Q. And Hippo One, which is the first one that's referred to, was research into some of the effects of nicotine that people are familiar with, reduction of stress, controlling weight gain, correct?
A. Yes.
Q. And isn't it true that with respect to Hippo Two,

that research resulted in what's called a null result. That is, it failed to establish the hypothesis that was being advanced, correct?
A. Well, in terms of similarities with usurpine, it did show some significant results, but some of these hypotheses about comparability with usurpine were certainly not shown.
Q. The hypothesis of the study would be that nicotine be comparable with usurpine, but that proved not to be borne out by the research?
A. But there were other findings that were of interest.
Q. Isn't it true with Hippo One, what Hippo One showed, it didn't reveal any new data or new ideas that were not already then reflected in the then exiting published research?
A. It was trying to define the actions on stress systems, so I don't know if there was anything that was novel. But it sort of took the next step to go from what was non to see if they could reproduce it in this other system.
And they did develop a very elaborate sort of model of brain hormone effects of nicotine and how it reacts with stress and problems.
Q. The Hippo One showed something of a scientific

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conclusion that was not known to the scientific community.
It never did that, correct?

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A. I don't think it did, but it certainly made it clear
that BATCo was very aware of this issue and was thinking
about nicotine as an important factor in smoking.
Q. Absolutely, they wanted to do that for purposes of
being able to highlight the benefits of Ariel, correct?
A. Yes.
Q. After all the research was done, isn't it true that
this research that was the subject of the document that you
showed the jury, this research went out to a pharmacologist
by the name of Armitage so that he could do an evaluation
to see whether the research was any good or not, correct?
A. Actually, I don't recall. It's possible. I don't
recall his evaluation of it.
Q. Let's see if I can refresh your recollection. Do you
recall that there was an appraisal that was done of the
results of project Hippo by Dr. Armitage who was a very --
he was a very well known pharmacologist at that time,
right?
A. Yes.
Q. You recall that he did an appraisal of these research
reports, Hippo One and Hippo Two, and found them to be
unworthy of publication?
A. It's vaguely familiar. I haven't read that for
a long time, but it's vaguely familiar.
Q. Let's just bounce to the bottom page here. You

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recall the conclusion of his assessment at that time was
that the information of these reports is not sufficiently
complete to justify a new form of publication; do you
recall that?
A. Yes; I certainly see it now.
Q. Isn't it true that you don't have a basis, at this
point in time, for disagreeing with the assessment that was

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reached by Dr. Armitage at that time, do you?
A. No.
Q. I now want to go, these are all, let's go back to 116.2, if we could for a second. This document also then, I think as we indicated, makes some statements about a habit, makes some statements about addiction.
If we focus on this period of time before the 1964 report, the '64 report concluded that smoking was a habit, correct?
A. Yes.
Q. Prior to the time that that conclusion was reached in the '64 report, isn't it true that there were people in the scientific community who had expressed the view that nicotine was addictive in published literature?
A. Yes.
Q. In fact, there is a very famous or often quoted article that appeared in 1942 in a very prestigious journal called Lancet by Dr. John Stoneby said that cigarette

smokers are like nicotine addicts; they are smoking for the nicotine?
A. Yes.
Q. And there are other publications that took place long before this memo was written in 1961, that used the term addiction in talking about nicotine said basically people smoke for nicotine, correct?
A. Yes.
Q. In fact, isn't it true there were articles that were published with industry funding, here is one that talked about, this is Dr. Knapp's article in 1962, do you recall that Dr. Knapp published a paper on the addictive aspects of heavy cigarette smoking in 1962?
A. Yes.
Q. And isn't it true that this research, and this publication was actually sponsored by the tobacco industry?
A. I don't recall; it could have been.
Q. Well, let me see if I can flash that up. Right here do you see where it says this work was supported in part by grants from the American Cancer Society and the

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Tobacco
Industry Research Committee?
A. Yes.
Q. And the Tobacco Industry Research Committee that was
the TIRC which received from all this research funds from
the tobacco industry, correct?

1847
A. Yes.
Q. And the Larson Hague and Savette textbook, I think
you mentioned when you were being questioned by Mr. Weber,
that came out in 1961; did it not?
A. There were three volumes. I think the first was '61.
Q. And among the research that was summarized from this
textbook that was sponsored by the tobacco industry, among
the research it summarized was research about people
smoking for nicotine, and nicotine being addictive, right?
A. Yes.
Q. Now, at the time that these documents were written,
that's in the early 1960's, isn't it true that there were
actually documents that were written internally by BATCo
that specifically picked up on the language that was being
used in the published literature, like habits and
addiction?
A. I'm not sure what your question is.
Q. All I'm saying is, BATCo is a tobacco company, is
looking at the research that's being published on is it
habit or is it addiction, little unsurprising that they
write that down, they use those terms in their documents,
correct?
A. I can't say why they chose the terms. It could be
your explanation. It could be their own opinion.
Q. Do you recall that there was a research conference

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that took place in 1962 at BATCo where they specifically
took up the issue of the Royal College of Physicians
report; do you remember that?
A. I've not reviewed that document in some time, but I

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do recall.
Q. And the Royal College of Physicians issued a report in 1962 that said smoking is both a habit and it's an addiction. It's an addictive habit, right?
A. I believe so.
Q. And then we get BATCo documents that say, nicotine or smoking is a habit of addiction. Not surprising, is it?
A. I suppose. I mean, I can't say what made the people who wrote this document choose their words. That's a possibility.
Q. Now, you have also pointed out a couple other documents that by, and I want to touch on very briefly after the 1964 report. Let me see if I can get one of them up.
You have mentioned, you have talked about a document in 1979 a BATCo document that's kind of a, here is what might happen in the future of tobacco and cigarettes, a tenure product innovation type of plan. You remember talking about that?
A. Yes.
Q. And there was another document, I think, that was

part of what was called a structured creativity conference.
Do you remember showing the jury this language here from a cigarette as a drug administration system for public use has very, very significant advantages this is part of a structured creativity. Do you recall that document?
A. Yes.
Q. Isn't it true there were other internal documents written by BATCo's scientists that reviewed the literature to determine whether in fact smoking was addictive, correct?
A. Well, if you have some of those documents, I would like to look at them, there are documents that I have seen that say there are both psychological and pharmacological factors. But I've, I don't recall documents that say that

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nicotine was not a major factor.
Q. A I say, there was a report. There is a BATCo report on dependence on cigarette smoking and review, and this is a document that says by Dr. Comer. Dr. Comer was a scientist at BATCo; was he not?
A. I don't recall who he is.
Q. You recall reading the conclusion, it can be said at this point, this is an internal document they reviewed the literature, it can be said at this point the available evidence does not support the conclusion that smoking is specifically an addiction to nicotine and that all or even

1850

most smokers will regulate their intake of the drug to provide constant amounts.
You recall there were scientific reviews done by BATCo over the years that reviewed the literature and came to these conclusions?
A. That's what this paragraph says. I would actually like to see the, who the document, to what the -- who the document says. But this paragraph is as you read it.
Q. Have you ever asked plaintiff's counsel to provide you with other documents in addition to that BATCo had written in addition to the ones he showed you?
A. Well, I've been deposed 6 or 8 times. And I've testified in trial, 3 or 4 times. And I would have expected that other documents would have been provided to me that would convince me that there was good evidence that the companies did not believe nicotine was why people smoked cigarettes.
And I have not seen those documents.
Q. Apart from waiting for the lawyer from the defense to show you the document at deposition, did you ever take the step of asking the folks that you are associated with, gee, why don't you give me what BATCo or other companies have actually written internally that might express a different view? Did you ever make that request?

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25 A. I'll tell you what I've received are boxes of

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1 documents. And I have no idea how they are selected. But
2 I must have 6 or 8 boxes of documents I have reviewed over
3 the past three or four years.
4 I've looked at a number of documents. I don't
5 recall. I don't know the selection criteria. I can't.
6 Q. I guess you didn't ask about the selection criteria
7 then?
8 A. No, I didn't.
9 Q. Over this 1964 period of time, isn't it true that the
10 tobacco industry continued to fund published research into
11 the role of nicotine?
12 A. Yes; there was research that was funded on nicotine.
13 Q. Well, if you would focus for a moment on this one,
14 are you familiar that Dr. Armitage in particular continued
15 to do pharmacological work on the basis for the smoking
16 habit?
17 A. Yes.
18 Q. And that he in fact was funded through the tobacco
19 research counsel, which was funded by the tobacco industry
20 in Britain?
21 A. Yes.
22 Q. And Dr. Armitage actually talked specifically about
23 in this article, about the theory that, I guess it's right
24 down here, it is worth noting that someone smoking a
25 cigarette has literally finger tip control of how much

1852
1 nicotine he takes into his mouth by reducing the puff
2 volume or inhaling less frequently he absorbs less
3 nicotine.
4 Isn't it true the tobacco industry continued to
5 fund research, specifically investigating the theory of
6 whether and to what extent people smoke for nicotine?
7 A. That was true as of 1968. I'm not sure what happened
8 after that, but this, with respect to this study the answer

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is yes.
Q. Well, isn't it true that the TRC, the Tobacco Research Council effort in Britain in pharmacology spanned a period of years and resulted in literally scores of publications of articles and studies relating to the role of nicotine in smoking behavior?
A. Well, I think, what I don't know is the years and I know that there was a policy developed by the Tobacco Research Council, in the U.S. to try to avoid research that was addiction related.
Now, I'm not sure about the British research counterpart of that. And it would depend on the years also in terms of if such a policy were put into place when their policy would have started. And I don't have that information.
Q. Let's take a look at in one you mentioned role of compensation. Isn't it true the first published

1853

observation of compensation and compensatory behavior was the Luchassi article in 1967 which was funded through the tobacco industry?
A. Yes; this was one, it is one of the earlier ones. But again, 1967, I don't know the year when there was a decision that addiction related research was not a thing to fund, so.
Q. The CTR continued to do work on nicotine all the way through the early 1980s?
THE COURT: Let me ask did he bring up anything on the tobacco companies funding research.
THE WITNESS: Well, I'm trying to establish --
THE COURT: What in response to the plaintiff's case are all these questions about the funding.
MR. WEBER: It's offered for the purpose of demonstrating, your Honor, that the tobacco industry was saying things internally in its documents which he focused on in direct examination. And we are attempting to establish that the tobacco industry made no

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bones about
it, published research, made no bones about the role of
nicotine.
THE COURT: You'll have to then lay a
foundation that they controlled the research as to whether
someone they had given a grant to, that they controlled,
whether someone they gave a grant to had the right to seek

1854

to publish an article.
MR. BERNICK: Okay.
THE COURT: In other words, that they were the
controlling force that puts these articles out.
BY MR. BERNICK:
Q. Let's do that. In the case of Dr. Thornton's book,
are you familiar with Dr. Thornton who's a scientist at
British American Tobacco?
A. I know his name. I don't know him personally.
Q. Do you recall in connection with his work as an
employee sponsored a whole conference on the role of
nicotine in 1978?
A. Yes.
Q. And do you recall the results of that conference on
nicotine including compensation and smoking for nicotine
that the results of that research conference were published
by Dr. Thornton while he was an employee of BATCo?
A. Yes.
Q. And in fact that book has been cited by the Surgeon
General reports in 1981 and 1988; isn't that true?
A. Yes.
Q. Let's go to one final matter which is the issue of
ammonia.
You were shown a particular Brown and
Williamson document. You recall this one? This was a

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research conference on ammonia technology, correct?
A. Yes.
Q. And isn't it true that this conference itself,
indicates that one of the reasons that Brown & Williamson

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is actually looking at ammonia is because ammonia has important taste properties, or leads to important taste properties?
A. Yes.
Q. In point of fact, there has been published research over the years going all the way back into the early part of the century that basically says that ammonia and pH can also affect the taste experience of smoking, correct?
A. Yes.
Q. Now, I just want to pursue one other aspect of that, and I'll be done, Dr. Benowitz.
Isn't it true when ammonia is added to cigarettes, it's often added with sugars?
A. Yes.
Q. And ammonia, if enough ammonia is added, that can increase pH, but isn't it true if you add it together with sugars, when the two react, the sugar he tend to reduce the pH?
A. That's right. So, they are sort of opposing effects.
Q. So, if you are adding both ammonia and sugars, whether there is an effect on pH depends upon your recipe,

right?
A. Yes.
Q. And that's very similar if we go back to the way that tobaccos are blended, tobaccos in the United States that are used for cigarettes are a blended of burly and flue cured?
A. Yes.
Q. Those are two different kinds of tobacco; isn't that true?
A. Yes.
Q. And isn't it true that the burly tobacco is higher in ammonia and the flue cured tobacco is higher in sugar content?
A. Yes.
Q. So, even when it comes to blending plain tobacco, burly and flue cured, you are combining ammonias and sugars in the blending process; isn't that true?
A. Yes.

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Q. And in fact what imparts the distinctive taste that characterizes American cigarettes, is that balance between burly and flue cured ammonia and sugar contents, correct?
A. Probably. I don't know that much about that subtlety in terms of the American flavor characteristic.
Q. Let me ask you this. When it comes to the recon many companies used ammonia as part of reconstituted tobacco,

1857

correct?
A. Yes.
Q. And isn't it true when it comes to recon again when the ammonia was added, it was added to the sugar that we talked about?
A. Yes.
Q. Isn't it true in the case of Brown & Williamson recon, the more ammoniated recon you add, the effect actually is to lower rather than raise pH; isn't that the fact?
A. It could be; I don't know.
Q. It's not an area that you have investigated?
A. I've not specifically looked at that question; that's correct.
MR. BERNICK: I have nothing further, your Honor.

CROSS EXAMINATION

BY MR. LERMAN:
Q. Good afternoon, Dr. Benowitz. My name is Brad Lerman
I represent Philip Morris.
A. Good afternoon.
Q. And I'm going to try and be brief?
A. Okay.
Q. I've said that before. I'm going to try to live up to it.

1858

You testified about researcher at Philip Morris named William Dunn; is that correct?
A. Yes.
Q. And you showed the jury some documents that Dunn you know was either the author of or recipient of; is that right?
A. Yes.
Q. Doctor Dunn during his career at Philip

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Morris spent
most of his time studying smoking behavior; is that
correct?
A. Yes.
Q. He was a psychologist by training; is that right?
A. Yes.
Q. One of the documents that you showed the jury was a
Plaintiff's Exhibit 1054. This is a document called
motives and incentives in cigarette smoking. Do you recall
talking about this with the jury?
A. Yes.
Q. Now, when you testified, you testified that this was
a document that Dr. Dunn had used to make a presentation to
a conference in 1972; do you recall that?
A. Yes.
Q. In fact, isn't it true that this is actually a
document that was written after the conference reporting on
what occurred at the conference; isn't that right?

1859

A. That's correct.
Q. Now in this presentation, Dr. Dunn has the eloquent
beginning there is a lovely little island lying about 150
miles east of the Virgin Islands. It is in the northern
end of the Antilles?
A. Yes.
Q. And he's giving a flowery description of this
conference, right?
A. Yes.
Q. You pointed the jury to a particular passage of the
document where Dr. Dunn talked about no one has ever become
a cigarette smoker by smoking cigarettes without nicotine.
Do you remember that portion of the document?
A. Yes.
Q. And despite, none of them has captured a substantial
segment of the market; do you remember that language?
A. I do.
Q. Let me show you the language that precedes that
language.
You see where he says the majority of the
conferees would go even further and accept the proposition

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22 that nicotine is the active constituent of cigarette
23 smoke, Dr. Dunn is referring to a consensus at this
24 meeting, isn't he?
25 A. In that sentence, yes.

1860
1 Q. And as he goes on, he says, without nicotine the
2 argument is there would be no smoking. He's talking about
3 discussions that are held at the conference; isn't that
4 right?
5 A. With respect to that; it is true.
6 Q. And so this portion of the document does not
7 necessarily reflect Dr. Dunn's own personal views. It may,
8 but it does not necessarily reflect his views?
9 A. If it's one paragraph, it's hard to say. Certainly,
10 the other parts of the document do suggest it is Dr. Dunn's
11 view.
12 Q. Let me show you the last paragraph of this document,
13 Dr. Dunn, well, actually there is one other section, Dr.
14 Benowitz.
15 Dr. Dunn goes on to talk about conceiving of
16 the cigarette as a day's supplier or a package or day's
17 supply of nicotine; do you recall that?
18 A. Yes.
19 Q. Let me show you another paragraph in the document.
20 You see where he says, less anyone been made unduly
21 apprehensive about this drug like conceptualization of the
22 cigarette, let me hasten to point out, that there are many
23 other vehicles of sought after agents which dispense in
24 dose units.
25 Wine, is the vehicle and dispenser of alcohol,

1861
1 tea and coffee are the vehicles and dispensers of
2 caffeine. Matches dispose dose units of heat, and money
3 is the storage container vehicle and dose dispenser of
4 many things; do you see that?
5 A. Yes, but I'm going to have to add that he didn't just
6 say it was a vehicle. They also talked about a lot of

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characteristics of it that were particularly useful which are not talked about here.
Q. What he's saying is conceptualizing something is a dispenser of a dose is not something that necessarily applies to an addictive drug is it; that's what he's saying?
A. That's right.
Q. Now, at the end of this document, Dr. Dunn says the following. This is the end of my presentation, if you have been intrigued by any of these ideas, I recommend the recently published volume entitled smoking behavior, motives and incentives, a compendium of papers presented at this St. Martin's conference published by Winston and Sons in Washington D.C.
The papers that were presented at this conference were in fact published in the book, weren't they?
A. Yes.
Q. And I know this doesn't surprise you, I just happen

1862

to have the book here, Dr. Benowitz. This is plaintiff's Exhibits I W P 11525. This book came from the Columbus State Library of Ohio, in Columbus, Smoking Behavior and Motives and Incentives by William Dunn. Did you know, do you know when it was published, doctor?
A. 1973 or '4.
Q. That's right. It was published in 1973. And the book contains various presentations made by people who were at this conference, right?
A. Yes.
Q. The same conference that Dunn is reporting on in that document, correct?
A. Yes.
Q. And the people who were there were varied, some of them very distinguished scientists; is that correct?
A. Yes.
Q. Scientists from Harvard and from Queen's College of the City of New York and the Institute of Psychiatry from

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London and Columbia University; do you see that?
A. Yes.
Q. All right. And this book has been available to the public and in fact still is in the Library in Columbus -- but we have got to get it back next week or pay a fine -- for 25 years or so; isn't that right?
A. Yes.

1863
Q. Nothing is secret about what was discussed at that conference, was there, doctor?
A. No.
Q. Now, you also talked about Dr. DeNoble; do you recall that?
A. Yes.
Q. And you were talking about some of the work that he did at Philip Morris with rats?
A. Yes.
Q. Now, isn't it true by the time Dr. DeNoble began experimenting and the experiments that you described, with respect to Dr. DeNoble were what you called reinforcement experiments; is that right?
A. Yes.
Q. He was seeing whether or not nicotine was a reinforcer in rats?
A. Yes.
Q. In other words, you could train the animal to administer the drug to itself or do something to make it get nicotine?
A. Yes.
Q. Isn't it true by the time Dr. DeNoble began those experiments at Philip Morris it had already been established in the scientific communities that animals would treat nicotine as a reinforcer?

1864
A. There would be, there had been some studies showing that, and some people claiming it was very difficult. I think his finding that part of it was not necessarily earth shaking, but I think his work with acid aldehyde was very interesting, and no one else I know was doing that.
Q. Is his work for rat reinforcement for nicotine, you will agree with me was not necessarily ground

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breaking?
A. Well, no, it was not ground breaking. But it clearly, what it was addressing the question role of nicotine in maintaining smoking.
Q. In fact, the 1988 Surgeon General's report cites the various studies that preceded Dr. DeNoble in which animals used nicotine in a reinforcing fashion?
A. Yes.
Q. And the fact a substance is a reinforcer doesn't mean it's addictive, does it?
A. No.
Q. Now, in fact, some of Dr. DeNoble's work was cited to in a chapter that was written by Dr. Henningfield; is that right?
A. Yes.
Q. Are you aware of that?
A. Yes.
Q. And in 1984 Dr. Henningfield published something called Behavioral Pharmacology of Cigarette Smoking, and in

it he cites to some of Dr. DeNoble's work; is that right?
A. Yes, I believe that Dr. DeNoble had presented the work at a conference, and actually was submitted for publication and accepted but withdrawn. But his work that was presented at the conference was seen by other scientists including, Dr. Henningfield.
Q. Okay. And here right at the bottom without going through this, you can see right at the bottom of this document a citation to Dr. DeNoble's work. Doctor Mele and Dr. Ryan, those were scientists at Philip Morris, correct?
A. Yes, but was that cite to a meeting or to a publication?
Q. And I guess the document doesn't tell us?
A. Well, the back of the document with the reference list would tell you.
Q. All right. And I don't, I'm sorry. I apologize. I don't have that up at the podium with me.
Now, Dr. DeNoble in doing his work did not conclude while he was working at Philip Morris that

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nicotine was addictive, did he?
A. No, but he --
THE COURT: Does he have any knowledge? I don't know why we are asking these questions. How would he have personal knowledge as to what somebody else concluded, what somebody else. He can repeat what

1866

somebody else had written, but how can he state what somebody else concluded.
MR. LERMAN: Only to clarify the nature of Dr. DeNoble's work do I think this is relevant.
THE COURT: Well, I think it's, it's not admissible, because he doesn't have personal knowledge. And if you ask him to repeat an out of court statement made by your client, it would be hearsay. And I really don't want it as an out of court statement offered against your client, which would not, if you go to an out of court statement in support of your client, he can't offer it because it is hearsay.
If you are asking him simply what somebody else's mind set was, he doesn't have personal knowledge to testify.
MR. LERMAN: And, your Honor, I'll move out, and the only thing I would point out I would be offering DeNoble's conclusions, not for the truth, but merely to show what he concluded, he did work, he reached conclusions. To me the conclusion is what's relevant, not the truth behind it at this point. But I'm going to move on, your Honor.
Q. You talked about Kathy Ellis in your direct testimony; do you recall that?
A. Yes.

1867

Q. Now, Dr. Kathy Ellis is a pharmacologist by training; is that correct?
A. I believe so.
Q. And she works at Philip Morris?
A. Yes.
Q. And now she's one of the senior scientists

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at Philip
Morris; is that right?
THE COURT: If you know.
THE WITNESS: I thought she was a director of world wide scientific affairs or something. I'm not sure. She is a scientist in terms of doing the sciences. She's a scientific administrator.
Q. And she contacted you after you were deposed in a case that was being litigated in the State of Washington, right?
A. Yes.
Q. And she called you to tell you that Philip Morris would be willing to make cigarettes available to you with different amounts of ammonia; do you recall that?
A. Yes.
Q. And she said that if you wanted to do research on them, she would prepare those; do you recall that?
A. Yes.
Q. You said you would be interested in that; is that right?

1868

A. Yes, but we also talked about what the issue was, meaning the question of pH. And so I think it was quite clear to her that, that the scientific question was really whether pH influences the rate of absorption of nicotine in the body.
Q. Wasn't one of the questions that you wanted to study whether or not ammonia affected pH?
A. No, the study, that was not my interest at all. My interest, and I think it's quite clear, is whether pH means or results in faster absorption of nicotine in the blood stream.
Q. Doctor, do you recall you were deposed in a case in May of 1998 called the Angle case?
A. Yes.
Q. All right. Do you recall this question and answer. Question: Can you describe them and what are these cigarettes again? Answer: These are cigarettes that supposedly would be like a full flavor

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cigarette, but
varying in ammonia content. So, they would look at the.
Question: Does ammonia impact on the amount of free
nicotine in smoke or unprotonated nicotine in the smoke?
Does it impact on the rate of absorption into the blood
stream; do you see that?
A. Yeah, well, I haven't seen what preceded this, but
the whole issue behind all of this is really the pH

1869
question. It's really what I drew in that diagram with the
different amounts of free nicotine. That's the key
question.
I've assumed that ammonia is what causes the
change, because that's what all the documents I've read
said. But I'm not a cigarette manufacturer. And if
that's not the case, still the crux of the matter for me
is the pH.
Q. Well, let me point you to some additional testimony,
and what the objective of the research was that you wanted
to find. Answer: Well, there are two questions. One is
having different levels of ammonia in the cigarettes, what
impact does that have on the amount of unprotonated
nicotine in the smoke.
That's something Dr. Pankow looked at it and
Dr. Pankow is somebody that you do work with; is that
right Dr. Benowitz?
A. I have, we had, we have talked about it. He's a
colleague from Oregon.
Q. And you go on and then assuming that he finds that it
is different, then what I would do is look at the rate of
absorption into the blood stream; is that right?
A. Right. But all this is focused on the pH question
which is how ammonia is supposed to act.
Q. All right. So, then it's true that you asked Philip

1870
Morris to prepare cigarettes with different amounts of

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ammonia; is that correct?
A. Yes, but with the scientific question being, and I'm sure Dr. Ellis understood this, we talked about this, the real question is does pH differences affect rate absorption of nicotine.
Q. Doctor, under oath you testified there were two questions to be answered?
MR. COUGHLIN: I would object to the argument.
Q. Did Dr. Kathy Ellis have cigarettes six prepared with differing amounts of ammonia?
A. Yes.
Q. And did she do tests on those cigarettes to see if ammonia varied pH?
A. Yes.
Q. And did she also have Mr. Reichert who we have already testified about at Labstat and Mr. Weber showed you some results, did she have Dr. Reichert perform tests on those cigarettes?
A. Yes.
Q. And were the results of those tests that she had performed that ammonia did not affect to any wide degree pH levels?
A. Yes.
Q. -- in those cigarettes?

A. Yes.
Q. And were you apprised of those tests? In other words, were you copied on the results of those tests from Dr. Reichert?
A. Yes.
MR. LERMAN: I have nothing further, judge.
THE COURT: Do you have any redirect?
MR. COUGHLIN: Yes, your Honor.
THE COURT: Do you have any for Lorillard.
MR. FOWLER: No questions, your Honor.
MR. COUGHLIN: Doctor, you remember being asked some questions, testimony in '89 in the, I think it's the Grenell case?
A. Yes.
Q. And you were being asked questions about whether you would change your mind about the use of the word

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addiction;
do you remember that?
A. Yes.
Q. And at the time what were you equating the word
addiction to?
A. Well, we were talking about the fact that dependence
and addiction were used interchangeably in the Surgeon
General's report and if my own writing.
Q. And at the time you preferred to use the word?
A. Well, at this time, I thought dependence would be

1872
more precise from a scientific point of view because of
some concern of some of the connotations of things like
anti-social behavior, et cetera. And so I thought at that
time, and as I said before, I don't think that's an issue
because people's understanding in general has changed by
that time. I thought dependence would be more clearly
understood.
Q. You weren't equating it to a habit, were you?
A. No; I never said it was a habit.
Q. And you are not alone in this definition of addiction
and dependence being equal; is that right?
MR. WEBER: Your Honor.
THE COURT: Sustained as to form.
BY MR. COUGHLIN:
Q. Are you alone in this equation of addiction to
dependence?
A. No, I think many scientists who, many public health
organizations have endorsed the concept that tobacco use is
an addiction. And nicotine is an addiction, and I think
that, and in that context dependence and addiction are
embraced as equivalent.
Q. And the American Medical Association would be one, is
that correct; is that right?
A. Yes.
Q. American Heart Association?

1873
A. Lung association, yes.
Q. The British American Association?
A. Not British.
Q. I mean, British Medical Association?
A. Medical Association, yes.

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Q. Mr. Weber had asked you some questions about some research with pH and trying to what he -- he said break the tar nicotine ratio?
A. Yes.
Q. Okay. And is there a common tar and nicotine ratio?
A. Well, in general, the ratio of tar to nicotine is between say 10 to 15. So, it means the tar level is 10 to 15 times the level, tar level of nicotine.
Q. And had he showed you some articles where people were trying to up the nicotine level and lower the tar level; is that right?
A. Right.
Q. And that was to reduce the carcinogens; is that right?
A. Yes; that's correct.
Q. Now, when we looked at those internal documents, when they were trying to up the free nicotine, or up the kick, were they doing that to reduce the carcinogens? Was that the primary purpose?
MR. WEBER: Let me object, unless he knows the

1874

purpose, your Honor, foundation.
THE COURT: Sustained.
BY MR. COUGHLIN:
Q. What did it appear to you from the documents that you had reviewed that they were doing that for?
MR. WEBER: Same objection.
THE COURT: Sustained.
BY MR. COUGHLIN:
Q. At the time that you had taken a look at those internal documents, what brands were they comparing?
A. Well, some of the comparison documents looked at Marlboro versus Winston and Kool versus Salem.
Q. And what was RJR trying to do?
MR. WEBER: Objection, your Honor.
THE COURT: He can't testify as to what somebody else's purpose was.
BY MR. COUGHLIN:
Q. What did the documents indicate RJR was trying to do?
A. Those were marketing research, they stated that they wanted to try to figure out why Marlboro was doing so much better than Winston and why Kool was doing so

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much better
than Salem.
Q. And would you also take a look at Exhibit 1223? And this was a December 4, 1973 document from Frank Colly; do you recall, do you remember looking at that?

1875

A. Yes.
Q. It is suggested to develop a new RJR youth appeal brand based on the concept of going back at least halfway to the technological design of the Winston and other filter cigarettes of the 1950's; do you see that?
A. Yes.
Q. And at --
MR. WEBER: Objection, your Honor. I asked no questions about this document at all.
THE COURT: I'm not sure what the question is.
BY MR. COUGHLIN:
Q. The question is that there was an inference they were doing it to reduce the carcinogens and here at the bottom?
THE COURT: I'll overrule. I think it has some relevance.
BY MR. COUGHLIN:
Q. It says still with an old style filter, any desired additional nicotine could be released on pH regulation?
A. Yes.
Q. Is that consistent with what you saw on the other documents?
A. Yes.
Q. They talk to you about comparing the magnitude of, I guess, nicotine with caffeine, the magnitude, the impact on people?

1876

A. Yes.
Q. Can you tell us what, can you tell us a little more about that?
A. Well, there has been quite a lot done on comparing caffeine and nicotine in terms of strength of compulsive use and about consequences of use. Caffeine is absorbed slowly. It's got some mild stimulative effects. If you are a regular coffee drinker, when you stop it, you get a

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headache. So, it does have some of the characteristics that we talked about.

There is very little evidence though that people, when they have medical reasons not to use caffeine, cannot switch away from caffeine. That, that people use caffeine when they are, are good reasons not to do so. And certainly in terms of harm of caffeine, there is very little medical evidence that caffeine is harmful, other than causing some symptoms from drinking too much coffee.

In contrast, nicotine has been shown to affect a number of different types of behaviors. Besides mild stimulation, we have talked about a variety of different behaviors, stress reduction, relaxation, anti depression, effects mood modulation. There is a great deal of evidence that people are not able easily to quit smoking when there are compelling medical reasons to do so.

1877

And at the same time nicotine is associated with tremendous health consequences with respect to death and chronic disease.

The issues for caffeine and nicotine are just totally different, and I don't think, I don't think that they can be equated in any way.

Q. Mr. Bernick showed you a document 3318, and he asked you about whether, whether B and W was looking at nicotine ammonia technology to enhance flavor; you remember he showed you that document?

A. Yes.

Q. Were they also looking at it to improve the nicotine transfer; did that document also indicate that?

A. Yes; they -- it did.

Q. Finally, Philip Morris, the attorney talked to you about, about Mr. William Dunn; do you remember that?

A. Yes.

Q. And he talked to you about a book, and he showed you

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a book. And we were taking a look before that at Exhibit 1054, the Dunn paper?
A. Yes.
Q. Was this published in that book?
A. I don't know if it was published verbatim. I have to go back and recheck the two. I don't recall exactly how much it was published and how much it was not.

1878

Q. But it's clear, it's clear to you from reviewing, is it clear to you from reviewing the internal documents of the industry that the documents reflect that the industry had knowledge, full knowledge of nicotine and its impact?
MR. WEBER: Objection.
THE COURT: Sustained.
BY MR. COUGHLIN:
Q. What do you conclude are the internal review of the documents of company and their knowledge about nicotine and its addictive nature?
MR. WEBER: Objection.
THE COURT: Sustained.
BY MR. COUGHLIN:
Q. Was there anything that you saw that defense attorneys showed you today that is inconsistent with your conclusion that nicotine is addictive and that the industry knew this?
A. No. In fact, I think the fact that the industry was supporting and sought research by outside scientists relating to addiction, the fact they sponsored a conference and published proceedings on addiction or topics related to addiction makes it very clear the industry knew as much as scientists knew that people were smoking cigarettes for nicotine, that nicotine was addiction producing or dependence producing, if you don't like the term addiction.

1879

But that's why people were smoking cigarettes, and they knew it for a very long time.
MR. COUGHLIN: No further questions.
THE COURT: Thank you. Thank you, doctor.
Would the plaintiff -- well wait just a second.

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Would the
attorneys approach once.
(The following discussion was conducted at the
side bar between court and counsel, out of the hearing of
the jurors, as follows:)
THE COURT: Anybody else writing. One juror
had a question which reads: What happens to -- what
happens to a smoker who does not inhale, if anything?
MR. WEBER: Does not what?
THE COURT: Inhale, if anything. You can ask
follow-ups if you want, just on that limited issue.
(The following proceedings were conducted in
open court.)
THE COURT: Doctor, what would happen with
regard to addiction or nicotine with regard to a smoker
who does not inhale?
THE WITNESS: Well, a smoker who does not
inhale would not likely to become addicted. There are a
few, not very many, we have actually studied this. And a
relatively small percentage of daily smokers don't inhale.
There are people who don't smoke every day who

1880

smoke occasionally at parties or with friends who don't
inhale very much. But most regular smokers, and we
studied a great many, who smoke every day do inhale, and
they are dependent.
THE COURT: Does the plaintiff have any follow
up on that limited area.
MR. COUGHLIN: No, your Honor.
THE COURT: Does the defendant?
BY MR. WEBER:
Q. Just one. If it were not inhaled, just held in the
mouth, that would be mouth and throat sensation that you
described earlier, correct?
A. Yes.
MR. WEBER: That's all.
THE COURT: Thank you, doctor.
Would the plaintiff call your next witness?
Does the plaintiff wish to make any interim

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argument before obtaining the next witness.
MR. COUGHLIN: We would just call our next witness, your Honor.
THE COURT: Do you have any requests for interim argument?
MR. WEBER: No, your Honor.
THE COURT: Okay.
MR. COUGHLIN: Your Honor, we would play a tape

1881

next of Dr. Osdene.
MR. LERMAN: Your Honor, can we approach. We have a motion on this.
THE COURT: Is the motion you made before trial?
MR. LERMAN: No, your Honor.
THE COURT: Okay, I would afford counsel an opportunity to approach.
(at side bar)
MR. LERMAN: Your Honor, we filed a motion. I'm certain this court hasn't had a chance to read it. I have it with me.
THE COURT: What is it?
MR. LERMAN: The thrust of the motion is, I understand we lost the motion. We would ask the court to limit the number of repetitions. These are lengthy depositions in which, very prejudicial questions are asked over and over again, and which he seeks the same answer.
MR. COUGHLIN: I'll tell you what I'll do. I'll play it for a while so they can get it. I think the tape may be 40 or 50 minutes. I'll play 10 or 15 minutes and put a transcript in for the rest of it. And the jury can look at it.
THE COURT: My thoughts would be more we don't need more than four or five minutes of it, and if you want

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to admit a transcript.
MR. LERMAN: Your Honor, there are two other issues. One is we would like certain portions of this deposition counter designated to show the absurdity of

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some of the questions he takes the Fifth Amendment.
The second issue, some of the questions --
THE COURT: Actually, I think you do criminal work.
MR. ADELMAN: Occasionally.
THE COURT: You may be in a position where counsel advises him, you can't pick or choose as to how much you waive, whether it's a pack of Marlboros or not. He was likely being advised. You take a risk, if you answer as to one question, you have waived.
So, anyways, in terms of the time, I don't want to do this more than a couple of minutes.
MR. COUGHLIN: Okay.
THE COURT: And just pick a couple questions.
MR. LERMAN: Can we at least get portions of the transcript we would like read.
THE COURT: We can do that all at once.
MR. COUGHLIN: The next witness is Dr. Farone. And he will, a lot of this stuff, I think what he is going to say --
THE COURT: You can -- I'm just not going to

spend the time, having a question offered and have him refuse to answer. If you want to pick five or six questions that you think are important, you can pick them. But we are not going to spend 45 minutes just to hear the questions.
And then if you want to designate some portions you wish to offer, I'll hear that subject before they close their case. And I'll make a decision at that time.
MR. COUGHLIN: We'll just play it right now, just a couple minutes, and later if they want to play more, we'll just ask four or five questions.
THE COURT: And if you want to designate some written portions.
MR. LERMAN: In the meantime, may I ask the court to consider the written motion and see if

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it affects
your thinking on going forward.
THE COURT: I think you have stated the
grounds, and at this point I'll deny it. It's basically
on the issue I think the underlying authority that the
jury is permitted to draw an inference in a civil case
such as this. And while you -- the fact that Philip
Morris went in and tried to argue soliciting testimony may
go to the witness.
But I think it goes to the admissibility. And
I made the finding earlier there is an allegation the jury

1884

can find there was a conspiracy among these people. And
if so, it can be offered against the co-conspirators as
well as Philip Morris.
And then just finally, the court has earlier
made a finding that the matter's not more prejudicial than
probative. Because of his position principally with
Philip Morris and his direct contact with so many
important questions concerning this.
MR. LERMAN: Your Honor, finally just for the
record, we do in our motion identify certain questions
that are asked that we think are objectionable, regardless
of the answer the witness gives. There is quoting from
the ashes to ashes book, and some others.
THE COURT: That's not going to be a part of
this, right.
MR. COUGHLIN: No. Do you know where it is?
I'll try not to play it.
THE COURT: If you want to raise an objection
as to a particular question, you can do it.
MR. LERMAN: Thank you, your Honor.
THE COURT: If the jury will be seated. We see
that juror number 2 and number 3 kind of coordinated their
outfits today. We'll try to ask them what they will be
wearing tomorrow.
I'll ask the plaintiff at this time to call his

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1885

next witness. I don't mean to make light, but you'll see the attorneys have different uniforms for the day. The plaintiff's is the blue uniform. Tomorrow you'll likely see them in the gray uniform.

MR. ADELMAN: If I may, your Honor, I will call Thomas Farone.

THE COURT: Thank you.

WILLIAM A. FARONE

called as a witness by and on behalf of the Plaintiff, being first duly sworn, was examined and testified as follows:

THE COURT: And if you'll state your name and spell your last name for the court reporter.

A. My name is William Anthony Farone, F-A-R-O-N-E.

THE COURT: Mr. Adelman.

- - -

DIRECT EXAMINATION

BY MR. ADELMAN:

Q. Doctor, good afternoon. Doctor, can you tell us where you are from?

A. Irvine, California.

Q. And how are you employed now?

A. I am a President and Chief Executive Officer of Applied Power Concepts, Incorporated.

Q. And generally and briefly tell us what Applied Power

1886

Concepts does?

A. We develop remediation technology and replacement for things which pollute the environment.

Q. Are you the President?

A. Yes, I am.

Q. How many people do you employ?

A. 12.

Q. Are any of those people scientists?

A. All of them.

Q. How long have you been engaged in Applied Power Concepts?

A. 13 years.

Q. Prior to that time, which brings us back to the mid-'80's, where were you employed?

A. At a prior company called Advanced Scientific Applications Incorporated from 1984 through 1987, when Applied Power Concepts bought it out.

Q. Now, was there ever a time you worked for

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Philip
Morris?
A. Yes, there was.
Q. When was that?
A. From the end of March, 1976 to July, 1984.
Q. In what capacity did you work at Philip Morris?
A. The first year I worked for Philip Morris I had
position of Associate Principal Scientist, reporting to Dr.

1887
Robert B. Seligman, Vice President of Research and
Development. The mission was to learn about the business.
And then for next seven years, I was Director of Applied
Research, at Philip Morris.
Q. And where geographically were you situated during
those 8 years of Philip Morris?
A. At the laboratories in Richmond, Virginia.
Q. Before we can go on, can you give us a bit of your
educational background, let's say, starting in college?
A. I received my bachelors in science in 1961 from
Clarkson University. My major was in chemistry with minors
in electrical and chemical engineering. I received my
masters degree in chemistry completed in 1962, received a
degree in 1963. I received my doctor of philosophy in
chemistry in 1965, also from Clarkson University.
Q. Have you ever taught?
A. I taught college for two years, associate professor
of chemistry at Virginia State University.
Q. And have you ever been involved in writing articles
in the field of chemistry or related field?
A. Yes, I have some more than 50 publications.
Q. Now, have you ever done or made any application for
patents?
A. Yes, I think I'm inventor on some 13 to 15 different
patents.

1888
Q. Was there a time you were employed by Lever Brothers?
A. I was employed by Lever Brothers in 1967 through
1975.
Q. And where in Lever Brothers complex did

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you work,
sir?
A. At the laboratory in Edgewater, New Jersey.
Q. And briefly, what type of work did you do there?
A. I began as a Senior Scientist and advanced to Manager of New Product Development. And I became their Director of Scientific Research in 1972, a position that I held until 1975.
Q. Now, you joined Philip Morris in 1976, correct?
A. Yes.
Q. And what did you do in the interim years between 1965 and 1976?
A. I was Vice President of Research Development of a company called PBVO International.
Q. Did you seek out the position at Philip Morris that you obtained?
A. No, I did not.
Q. How did it come about that you joined Philip Morris?
A. I was sought by an executive search firm of Hide, Direct and Struggles.
Q. Now, moving ahead, looking to the 8 years of your employment at Philip Morris, could you tell us what type of

1889

tasks you were assigned to do?
A. The first year I was acquainting myself with all of the work that was going on, the major tasks for which I was hired, two tasks basically to help the company diversify into areas other than tobacco and cigarettes, and the second was to help them produce better products, that is, both economically and also from the issue of safety, safer products.
Q. To the first point, can you tell us what you did or what you were asked to do with respect to diversification?
A. The concern when I first was interviewed, and as I came there, was the industry was under tremendous pressure on the health issues. And the concern was that people would reduce smoking and decrease their smoking in which

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case they needed to have other businesses that they could diversify into.

And so I helped with what's called merger and acquisition analysis, suggesting firms that they might acquire that would compliment their business and helping them analyze firms which other people suggested they might acquire to compliment their business.

Q. Was there anything in your background that enabled you to do that?

A. I had performed a similar function for Lever Brothers. Lever Brothers is owned by Uni-Lever. It

1890

acquires companies worldwide.

Q. Now, you mentioned the second issue with your engagement, which is the safer cigarette. Was that a reason you went to Philip Morris?

A. That was one of the challenges was to help them develop a safer product, yes.

Q. Did you discuss that initially before you took the job?

A. I did. That was the, is subject of discussion with virtually all of the people that I interviewed with.

Q. And who were they?

A. In New York City I interviewed with Dr. Robert B. Seligman, who was going to become the Vice President of R and D and to whom I would report; Mr. Cliff Goldsmith, who was I believe at that time the President of Philip Morris USA.

In Richmond I interviewed with Dr. Helmut Wakeham, who was Vice President of R and D at that time, Mr. Frank Resnick, who was Director of Research, Dr. Thomas Osdene, Director of Biochemical Research, Dr. Walt Gannon, and Mr. William Dunn.

Q. Taking all these people collectively that you have just mentioned, was it represented to you that Philip Morris was committed to developing a safer cigarette?

A. Yes, it was.

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Q. Did you accept that?
A. Yes, I did.
Q. Was that a motivation for you to come there?
A. Yes, it was a challenge to take a product which is used by a lot of people and to make that product safer.
Q. Now, as Director of Applied Research, how many people did you supervise?
A. It changed over the 7 year period, started with about 40 at one time. It may have been often over 200. I never really counted them. The average was about 150.
Q. Were any of these people scientists?
A. Approximately a third, I think, held advanced degrees. Maybe another third had bachelors degrees, and a third were technicians.
Q. To whom did you report?
A. For approximately the first half of my career there I reported to Robert B. Seligman, and for the second half Dr. Max Hauserman.
Q. Now, I'm going to ask you as we go on here a number of questions about a number of topics. But I want to predicate my next two points on that you worked there at Philip Morris for on to 8 years; is that correct?
A. That is correct.
Q. And did you see things and observe things and find things out that bothered you from a professional point of

1892

view?
A. Well, yes, and discussed them with people there.
Q. Well, that sort of answers my next question. Did you from time to time make your views known?
A. Yes, I did.
Q. When did you leave Philip Morris?
A. 1984.
Q. Under what circumstances?
A. I was terminated in July, and discussions leading up to that go back to, I believe, November or December of 1983. So it was just of 1984.
Q. Why were you terminated?
A. There is a history going into that. I'm not quite

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14 sure at the time I understood. But at the end of 1983, Dr.
15 Hauserman was asked by his boss Dr Wallace McDowell,
16 Mr. Wallace McDowell, to ask that I would be promoted to
17 Vice President of Research and Development.
18 I requested that not be done until they were
19 willing to make that promotion. But Dr. Hauserman
20 insisted on doing that. And they did it. And
21 subsequently within a few days after that Mr. McDowell was
22 terminated, left like in just one day, he was replaced by
23 Mr. James Remington.
24 And we had a meeting, did anything change, did
25 you wish me now to be promoted now. And no, they

1893

1 validated that I would still be promoted.
2 In the meantime, in the meantime my wife had
3 also been announced that she would be promoted. There was
4 another management change that involved Mr. Shep Pollock
5 leaving the company. Mr. Pollock was Mr. McDowell's boss.
6 And subsequently Mr. Remington's boss. He was the
7 President of Philip Morris USA. So he left, my wife was
8 told that she was no longer going to be promoted.
9 Q. Did your wife work at Philip Morris?
10 A. Yes, she did.
11 Q. What position did she have?
12 A. She was Assistant Manager of what was called the
13 green leaf stemery, which is where they process the initial
14 purchased tobacco. My wife filed an EEOC complaint against
15 the company. Subsequently, I was called into the office
16 and I was told that I would no longer be promoted. I asked
17 my boss, Dr. Hauserman what I should do about that.
18 He suggested that I retain an attorney. I
19 retained an attorney, wrote him a letter to that effect.
20 He was on vacation at the time I wrote the letter. And on
21 July 6th I was called into an office, he, my boss was
22 called back, and they indicated that I would be
23 terminated.

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Q. Did they give you a reason?
A. Insubordination.

1894
Q. Were you ever given a termination letter?
A. No.
Q. Were you insubordinate during your eight years there at Philip Morris?
A. I don't think so, but obviously they thought so.
Q. All right. Let's turn now to some more specific things. Can you tell the jury what your group did, as a general matter, what type of work did they do?
A. The group was crafted to explore many facets of tobacco technology. Specifically, what modifications could be made to tobacco. I was very much interested in the biotechnology aspect of modifying tobacco.
So, we formed what we called the Biomaterial Science Division to study how we could change tobacco so when it was burned it would produce chemicals that are less toxic, less hazardous. We also tried to change the physical characteristics of cigarettes to reduce things like carbon monoxides and oxides of nitrogen and things of that type.
And we also early in my career developed computer models that would allow us to predict how when the cigarette is burned you change the flow of chemicals coming out of the cigarette into the smoker, and into the side stream so its physical and chemical approaches to modification and cigarette.

1895
Q. Did your group do biological research?
A. No, we did not.
Q. Was there a group there that did that?
A. Yes. That group reported to Dr. Tom Osdene, and they would do the biological research.
Q. Let's talk a bit about Dr. Osdene. What group did he head?
A. The name changed over the time that I was there. Originally he was called Director of Research, and that's why my title was Director of Applied Research.

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And then
11 gradually many of the divisions that were involved in Dr.
12 Osdene's work were transferred into my directorate as we
13 called them.
14 And Dr. Osdene was, I think, towards the end
15 called Director of Biochemical Research and Extramural
16 Studies, or something like that. But basically it was the
17 biochemical side of testing.
18 Q. Was he there throughout the entire period of time you
19 were at Philip Morris?
20 A. Yes, he was.
21 Q. Did you come to know him personally as well as
22 professionally?
23 A. Yes, I did. He, for example, helped me get into some
24 of the local clubs because we traveled a lot on business
25 together. Our offices were not very far apart. We met at

1896

1 meetings, all of the time in my office, his office, so it
2 became we both collected stamps, for example, so we shared
3 a hobby.
4 Q. Now, did you discuss at any time with the senior
5 management people, people there both in the lab and the
6 management people, their views, their professional personal
7 views on their relationship between smoking and disease?
8 A. Yes, I did.
9 Q. With whom did you talk in the senior management?
10 A. Well, all of the people that I worked with and the
11 people that I reported to.
12 For example, Dr. Wakeham, Dr. Seligman,
13 Larry -- Dr. Hauserman, Dr. Gannon, Dr. Osdene, Dr. Dunn,
14 and people that I worked, who worked for me. It was a
15 constant subject of discussion.
16 Q. Now, can you tell us what their views were as to the
17 relationship between smoking and disease?
18 A. We were trying to make a safer product. And in order
19 to make a safer product, you have to know what's unsafe
20 about it.
21 So, we discussed the various means

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by which
22 cigarettes cause disease. To put it another way, during
23 the time I was there, no one stated, for example, that
24 cigarettes don't cause disease. We were looking at the
25 different chemicals that were produced from smoke that

1897
1 could cause disease and how we could reduce those
2 chemicals.
3 Q. Still, with respect to the senior management people,
4 did any of them indicate to you that they believed smoking
5 caused disease?
6 A. Well, yes. I mean, we had programs to reduce the
7 causes of disease, yes.
8 Q. You are saying that the premise of such a program is
9 you have to believe that smoking causes disease; otherwise
10 you don't do the research?
11 MR. LOMBARDI: Objection, leading.
12 THE COURT: Sustained as to form.
13 BY MR. ADELMAN:
14 Q. What was predicated for that?
15 A. In science you have a hypothesis. And you test the
16 hypothesis. Unless you can disprove the hypothesis, you
17 must accept it. That's how science is done.
18 So, the hypothesis is smoking causes disease.
19 And then you look at specifics as of how it could cause
20 disease, and there was no one there who refuted that
21 hypothesis. No one said cigarettes don't cause disease.
22 Q. I want to broaden the question, putting aside the
23 senior management people. Did you talk to the various
24 scientists there over time and learn whether they had an
25 opinion smoking causes disease?

1898
1 A. Yes, I did.
2 Q. And what was that opinion?
3 A. It was the same, there was no evidence that would
4 suggest that smoking doesn't cause disease. The predicate
5 for the research being done is that smoking causes disease.
6 And we are trying to reduce the chemicals or the things in

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smoke that cause disease.
Q. Put it this way, did any of those scientists or in the years you were there ever say to you they believed smoking did not cause disease?
A. No.
Q. Now, did you come to know about an entity called INBIFO?
A. Yes.
Q. INBIFO, what is INBIFO?
A. INBIFO is an acronym for a German name for an organization that performs biological testing in animals and in, at the cellular level. It's called in bitro in animals and in vitro is in cells and test tubes and so forth. And it's located in Germany, Cologne.
Q. May I ask when you first learned about INBIFO?
A. The research work that we were doing required us to have some understanding of whether or not the changes we were making were headed in the right direction to make a safer cigarette.

1899

And those tests were performed by Dr. Osdene's group. The cell level work was done in Richmond, Virginia. The animal testing was sent out, outside of Richmond, Virginia to be done either in Europe or other places. And INBIFO was the place where most of the work was sent out.
Q. When you first discussed or were informed about INBIFO, what was your understanding as to who owned and operated it?
A. My understanding, when it was first explained to me, was INBIFO was an independent company that would perform the research for us.
Q. Who told you that?
A. Dr. Osdene.
Q. Did there come a time that you learned something different about INBIFO?
A. Yes, later in my career, about the time that it was announced that I would be promoted, Dr. Hauserman explained to me, he was my boss, the Vice President of R

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and D at
that time, that INBIFO was actually owned by Philip Morris.
Q. That was about 1983?
A. Something like that, yes.
Q. Now, you began to talk a bit about the topic I want
to ask you about and that is animal testing. Did you in
your group do animal testing?

1900
A. No, we did not.
Q. Was animal testing necessary in order to safely
market the product consumed by the public?
A. Based on my experience at Lever Brothers, and one of
the reasons that Philip Morris said they were interested,
I -- at Lever Brothers I was in charge -- I was the senior
signatory on all the toxicology information that would be
developed on products like Aim toothpaste, Close Up
toothpaste, Wisk detergent, Dove bar soap, Crest. There
wasn't a single product we sold that didn't undergo the
animal and cell testing. So, it was required.
Q. What did you do about that since your group didn't do
animal testing?
A. We, as I indicated, would provide our results or the
modifications that we suggested to cigarettes to Dr.
Osdene's group, and they would do the animal testing
outside of Philip Morris and do cell level testing within
the research center in Richmond, Virginia.
Q. When you say outside of Philip Morris, where are you
referring to?
A. INBIFO, and there was also, as I understood it, the
possibility that some of this could be contracted to other
organizations besides INBIFO.
Q. And who told you that?
A. Dr. Osdene.

1901
Q. Did you think that was rather unusual that a company
with Philip Morris did animal testing outside of the
premises and particularly in Europe?
A. Yes, initially I asked Dr. Osdene why that was so.
Q. What did he say?

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A. And Dr. Osdene indicated that the reason for doing the testing in Germany particularly was that they did not want the results of those tests to be available if in fact the company was involved in litigation on safety and health.
Q. Did he give you any other reason?
A. No; that was the reason.
Q. All right. With respect to the animal research at INBIFO, what was your understanding as to why Philip Morris did it there?
A. Well, I just, one of the things he said was that, I mean, first of all, it's a qualified laboratory. But the second of all, that they had made the decision that they would do that.
And the other thing that was discussed several times with Dr. Osdene, Dr. Seligman, Dr. Hauserman, Dr. Helmut Gaisch from the Swiss subsidiary, was that there was an agreement among the tobacco companies that they would not do animal testing of their own products or of competitive cigarette products on the premise of the, each

of the tobacco companies, they would only do it in one of two ways.
One was, one way was if it was done in Europe or someplace else. The other way was if it was done under the aegis of the CTR, Center for Tobacco Research or through the Tobacco Institute.
Q. Now, about this agreement, Dr. Osdene told you about it?
A. Dr. Osdene, Dr. Seligman, Dr. Hauserman, Dr. Helmut Gaisch.
Q. Those gentlemen are all senior officials at the R and D facilities at Philip Morris in Richmond, Virginia?
A. Except for Dr. Gaisch. Dr. Gaisch was Dr. Osdene's counter part at our European -- Philip Morris had a laboratory in Switzerland where he was director of

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research.
Q. Did you ever talk to Mr. Kuhn about the agreement?
A. Yes, Mr. Kuhn, probably forgot a bunch. Mr. Kuhn,
Mr. Carpenter, Dr. Charles, other people who worked with
Dr. Osdene.
Q. Have you mentioned Dr. Wakeham?
A. No, I haven't.
Q. Now, you mentioned that you were a director. Were
there other directors in the facilities?
A. Yes, there were at various times four and then later

1903

five directors.
Q. Did you as a group meet from time to time?
A. We met approximately two to three times a month. The
Vice Presidents of Research and Development would call a
meeting of the Directors to provide information from
management in New York coming down to the directors, and
also to solicit our inputs, what was going on in our
directors, as we called them.
So, we could communicate with each other as to
what we were doing.
Q. With respect to the director group, was this an
agreement referred to, was this agreement referred to by
them?
A. It wasn't referred to. It was discussed periodically
at the meeting in terms of things we could do and could not
do.
Q. And of course Dr. Osdene was a member of that group,
correct?
A. Dr. Osdene was a member of the group, and we
discussed it. For example, we did do animal testing on
nicotine pharmacology. And that subject came up.
Specifically, I remember the question was, well, if you
can't do it on safety testing, how can you do it on
pharmacology.
And the answer was, well, that's not safety.

1904

You are just studying the nature of nicotine. So it was

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done on that, that was considered okay.
Q. When you needed biological testing, as I understand your testimony, you had to go to Dr. Osdene and have him do it?
A. Yes, his groups.
Q. And that would be done in Europe.
MR. LOMBARDI: Objection.
THE COURT: Why don't you move on.
BY MR. ADELMAN:
Q. Did you in fact ask him to do research on a biological level?
A. Yes, we submitted our samples to him, and he would provide feedback to us concerning the results in some cases, in some cases we never found out.
Q. Let's talk about the instances where you got results; in what form did you get results?
A. If there were two levels, one is the local level at Philip Morris in Richmond, where we did cell level testing in the laboratories.
Those results were in the formulas of reports which we could see. And the other way we would get results is that I would be told to talk to Dr. Osdene personally about results which came back from Europe, so he would be the collector of those results, and he would

1905

provide them to me.
Q. From what way did he provide those results from Europe to you?
A. Verbally.
Q. Did you ever receive written reports?
A. On two occasions I saw a written report which he told me I could not have a copy of because it had to be destroyed. And he subsequently took it back and presumably destroyed it.
I didn't see him actually do it.
MR. LOMBARDI: Your Honor, I would move to strike that.
THE COURT: Sustained as to the last portion. Disregard about what happened to reports that were given back.
BY MR. ADELMAN:
Q. Let me ask this question. Did Dr. Osdene

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say
18 anything about who was going to destroy these reports?
19 A. Yes.
20 Q. What did he say?
21 A. He said that he was going to destroy them. It was
22 his mission to do that.
23 Q. Now, did this strike you as unusual?
24 A. Very unusual.
25 Q. Why?

1906
1 A. Well, I was used to coming from a consumer product
2 company where those type of reports would be shared by
3 everyone. On the other hand, you know, I understood the
4 concern that the company had about not having those reports
5 available.
6 Q. Did you learn, I'm sorry, did you finish?
7 A. Yes.
8 Q. Did you learn from Dr. Osdene why it was that these
9 reports were destroyed?
10 A. Again, I was told when asked, when I asked him, I was
11 told that they did not want to have the animal test results
12 which showed negative health findings in their files in the
13 United States in case of litigation.
14 Q. May we have 4218, please.
15 Sir, these will be projected on the screens and
16 television.
17 MR. LOMBARDI: Your Honor, there is an
18 objection. I ask that this be taken off and have leave to
19 approach on it.
20 THE COURT: You can approach.
21 (The following discussion was conducted at the
22 side bar between court and counsel, out of the hearing of
23 the jurors, as follows:)
24 MR. LOMBARDI: Do you have a copy? Were you
25 looking for a copy?

1907
1 THE COURT: I just wondered what it was.
2 MR. LOMBARDI: It's handwritten notes, which
3 obviously were written by Osdene. I don't believe this
4 witness ever saw those notes during the time he was at
5 Philip Morris. I also have an objection

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because of the
document is hearsay, there is no.
THE COURT: What year are they?
MR. LOMBARDI: There is no date on the notes,
I.
MR. ADELMAN: Your Honor, this was already
introduced in evidence. There were some questions raised
by the authorship of it -- this man knows Dr. Osdene,
knows his handwriting, will be able to testify that it was
authored by Dr. Osdene.
Number two, it describes the process of
destroying documents and leads to questions about Dr.
Osdene had a safe in his house in which he kept documents
and eventually destroyed them.
THE COURT: You are saying he's going to
identify that he knows Osdene's.
MR. ADELMAN: Yes.
That does not go to the hearsay objection.
Even if you accept that's a document by Osdene, there is
no foundation that this is a business record or any other
record related to official Philip Morris business.

1908
THE COURT: Where is the document?
MR. ADELMAN: May I bring it up, your Honor?
THE COURT: Yes.
MR. ADELMAN: Your Honor, we submit, first of
all since this is a co-conspirator statement, your Honor,
there is a sufficient basis in this record to see already
take Mr. Osdene is a co-conspirator.
These are perhaps part of the reason he took
the Fifth Amendment if the court please.
MR. LOMBARDI: That does not go to the question
of whether this is an admissible hearsay, your Honor. He
needs to establish some kind of foundation to make this
hearsay, or take it out of the hearsay rule. It is not a
business record, and they will never get that foundation
for it.
THE COURT: There is a time on it.
MR. ADELMAN: No, your Honor, but he

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will say
18 that the circumstances suggested it was written during the
19 8 years that he was there. To answer counsel's.
20 THE COURT: Remind me again, he was there.
21 MR. ADELMAN: '76 to '84.
22 THE COURT: I'm just wondering if it is going
23 to be offered for the truth of assertions as a hearsay
24 matter.
25 MR. LOMBARDI: Look at the top. They are

1909
1 trying to offer it for, ship all documents to Cologne,
2 reference for destruction. That is their point they are
3 trying to make from this.
4 MR. ADELMAN: We have established already prima
5 facie conspiracy. He testified there was an agreement.
6 Secondly, these are a statement made by a
7 co-conspirator to further the conspiracy as the court can
8 see.
9 Thirdly, putting aside the co-conspiracy
10 statement, this is against penal interests against 804
11 (B)(3). As we see later, this gentleman took the Fifth
12 Amendment.
13 THE COURT: I'll allow it.
14 MR. LOMBARDI: Is my objection made now, your
15 Honor?
16 THE COURT: Yes.
17 (The following proceedings were conducted in
18 open court.)
19 BY MR. ADELMAN:
20 Q. Are you able to see that over there?
21 A. I can see it here.
22 Q. All right, good. I'll question you on that basis.
23 Before you is Exhibit 4218. Do you recognize the
24 handwritten or any of the handwriting, printing on that
25 document?

1910
1 A. Yes, I do.
2 Q. How are you able to do that?
3 A. I received many notes and comments from Dr. Osdene.
4 And this is his one of the characteristic things

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that he
5 always did was to refer to him as TSO. And if you look at
6 the bottom, the TSO is extremely characteristic of how he
7 referred to himself in all instances.
8 Q. For the benefit of the jury, where in the 8
9 paragraphs of this document is that TSO you are talking
10 about?
11 A. It's on point 8.
12 Q. All right. And that's highlighted here?
13 A. Right.
14 Q. All right; thank you.
15 Now, the document states, at paragraph one
16 there, ship all documents to Cologne by -- can you read
17 the next word?
18 A. No, I can't.
19 Q. Okay. Then it says keep in Cologne. Number 2, it
20 says okay to phone and telex. These will be destroyed?
21 A. Correct.
22 Q. Is that, are those statements consistent with the
23 things Dr. Osdene told you?
24 A. Yes, they are.
25 Q. Then if you will, paragraph 6, perhaps you might help

1911

1 us by reading, since you know his handwriting?
2 A. If important letters or documents have to be sent,
3 please send to home. I will act on them and destroy them.
4 Q. And is that statement consistent with what he told
5 you?
6 A. Yes, Dr. Osdene told me he had a safe in his house
7 where he kept both his stamp collections. We were both
8 stamp collectors. And documents that he received from
9 INBIFO, he would read them. There provided. They provided
10 information to us, and destroy them after he read them.
11 Q. Now, do you see a reference to INBIFO in this
12 document?
13 A. Yes, I do.
14 Q. Where is that?
15 A. Point 7.
16 Q. Just for the jury's benefit again, help us out?
17 A. Advisory Lander, and where I think that's in writing
18 it says re: INBIFO. The last part I can see

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clearly.
Q. All right; thank you.
May I have 1882. All right, this is Exhibit 1882. Did you ever, have you ever seen this document before?
A. Yes, I have.
Q. All right, the front page is before you. What does that relate to if you can tell us?

1912

A. Well, the area of smoking and health was sometimes called defensive research, as opposed to making a new product which is offensive research.
Q. Defensive research. What does that mean?
A. It means defending the company from attacks made against it into findings that may become available outside the company.
Q. What's the other type of research?
A. Offensive research refers to making a new product or developing something new.
Q. Had you ever engaged in defensive research before?
A. Not in the context of refuting things before they came out, no.
Q. That was unusual for you?
A. Yes.
Q. All right. Next page, please. Again, as part of this document, highlighted sections C and D, talking about the objectives for INBIFO. Maintain experimental capability to test for appropriate biological effect in any situation?
A. Yes.
Q. What does that mean to you from your experience at Philip Morris?
A. Well, these documents were discussed as part of our planning meetings at the directors level with the Vice

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President of Research and Development. And this is to make sure that they had the ability there at INBIFO to perform any biological tests that would be used on smoke, everything from mouse skin painting to inhalation studies of all kinds.

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Q. Does the phrase biological effect have any significance?
A. Well, in many cases synonyms are used to make it easier to read, so it is less -- more palatable to people.
So, for example, instead of saying carcinogenicity or mutagenicity.
MR. LOMBARDI: Objection, your Honor. There is no foundation that this witness has knowledge of who wrote this document or what the purpose of that person was in writing it.
THE COURT: Sustained; I don't think.
BY MR. ADELMAN:
Q. Let me rephrase it this way. Did you come to learn while at Philip Morris certain code words on the documents you saw?
A. Yes.
Q. Is biological effect a code word?
A. Biological effect and biological activity are code words.
Q. What are they code words for?

1914

A. As I indicated, code word is a synonym for something that sounds worse, so mutagenicity, carcinogenicity, teratogenicity, were usually lumped under the heading of biological effects or biological activity, so you wouldn't normally say mutagenicity.
Q. Could we have the next page, please.
And again the last page of the documents I'm going to ask you about, why do we need INBIFO, discussing on section D, subpart 2. Specific concern can be terminated at will as required without delay.
What does that mean to you?
A. The conversation was, if the experiment was not providing any useful information or was providing information that was not to be published, it could be terminated.
Q. What do you mean useful information?
A. Well, in one case we are trying to determine whether we are making products safer. So, they are testing it there to provide information on whether you have

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succeeded
20 in that goal.
21 And the other case, you are trying to refute
22 studies that are being published in the literature
23 concerning smoking and health.
24 So, there is two reasons for terminating it.
25 One is if it's not being useful in your program, and the

1915
1 other is if it doesn't provide information that can be
2 used on behalf of the company.
3 Q. You mean negative results?
4 A. Yes.
5 Q. All right; thank you.
6 Now, may I have Exhibit 1736, please.
7 This may be a little difficult. So, you will
8 probably do better with your copy.
9 Do you have before you 1736?
10 A. Yes, I do.
11 Q. Do you recognize that?
12 A. Yes.
13 Q. And it talks about proposed study by Levy. Who's the
14 Levy that's being referred to?
15 A. Doctor Carolyn Levy was the scientist who worked for
16 Dr. William Dunn. And she was in charge of looking at the
17 pharmacological, pharmacological effects of nicotine.
18 MR. LOMBARDI: Note my objections. Before we
19 go further, I don't believe the witness has testified that
20 he has seen this document, or certainly within the time
21 period that he was employed at the company.
22 MR. ADELMAN: Sure. I'll take that up.
23 Q. Were you employed at the company November 3rd, 1977?
24 A. Yes, I was.
25 Q. Have you seen this document before?

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1 A. Yes, I have.
2 Q. Now, are you familiar with the project of Miss Levy
3 there?
4 A. Yes, I'm familiar with the discussion about this
5 proposed study.
6 MR. LOMBARDI: Excuse me, your Honor. I
7 apologize. I may have misunderstood. I thought he said

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not while he was employed at the company, in which case this is a document that doesn't fall within his percipient knowledge in the 1964 to '94 time frame.
THE COURT: Didn't you say you were employed with the company at this time.
THE WITNESS: Yes, I was.
MR. LOMBARDI: I apologize.
BY MR. ADELMAN:
Q. I believe you were telling us about a meeting or discussing about her projects?
A. Yes. We had a discussion that occurred in the offices, where we shared close offices. I had come down and was talking with Dr. Dunn and sort of asked about what I thought about the study. And I thought that it was a good idea to run the study.
Q. Now, I refer you to the paragraph there, in the exhibit, that says if she's able to demonstrate as she anticipates no withdrawal effects of nicotine, we'll want

to pursue this avenue with some vigor.
If, however, the results of nicotine are similar to those gotten with morphine and caffeine, we'll want to bury it. Do you see those sentences?
A. Yes, I do.
Q. Did you discuss with anybody the notion of burying this certain results?
A. I discussed this with Dr. Dunn, and, you know, tried to indicate to him that if they were going to do it, my thinking was that they should publish it anyway, especially since publication did not necessarily mean you send it outside the company.
The publication in a company like Philip Morris can be you just write a report, and it's present in the library as part what we call central files. So, I didn't see any need to bury it, even if the results were negative, it wouldn't have gotten outside of the company.
Q. What did Dr. Dunn say?
A. I don't recall any objection to my point of view.

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Q. Do you know whether this project was completed?
A. I don't recall.
Q. What was your reaction to the notion set forth here in the exhibit of burying results of certain research?
A. I indicated I didn't see any need for it, especially since reports that are generated about research within

1918

Philip Morris would go only into central files. Nobody outside the company would see them. So, I really didn't see any need to bury any research.
Q. Let me turn now to one of your colleagues, Dr. DeNoble. Can you tell us whether he worked with you during your tenure there at Philip Morris?
A. He didn't work with me. He didn't work for me. He worked for Dr. Dunn in the behavioral pharmacology area, and Dr. Dunn reported to Dr. Osdene at that time.
Q. May I have Exhibit 2555 displayed. And the inner pages. Can you read that, sir?
A. I can read the one in front of me.
Q. There we go, do you recognize that page?
A. Yes, that's the front page of a report that -- the type of report I was just referring to, that stays within R and D, doesn't go outside, so.
Q. And you are copied on it?
A. Yes.
Q. And what was the subject of the report?
A. This was the semi-annual, it was the pharmacology annual report.
Q. Is there, within the report, reference to project of Dr. DeNoble's regarding nicotine?
A. Dr. DeNoble was studying the effects on various reinforcers in rats. And it indicated here that he found

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acetaldehyde was a reinforcer for nicotine.
Q. What's the significance of that finding?
A. Well, as discussed at the time and presented later, the finding is that it implies that acetaldehyde in smoke would enhance the effect of nicotine.
Q. Did Dr. DeNoble continue his research?
A. Find the date on this, Dr. DeNoble's

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research was
terminated at the end of 1983. This was written in June
1st, I think that's 1983, so for another few months.
Q. Are you aware of the circumstances under which his
research was terminated?
A. Yes, I am.
Q. What are they?
A. The research was closed down by order from New York
City from the headquarters company, because it was
indicated to us that it caused, it proved data which the
company did not want to have in the records.
Q. Were you present at any meetings where the matter of
closing down this research was discussed?
A. I was present at two meetings where it was discussed.
Q. Can you briefly tell us about those meetings?
A. It was discussed in our Vice President Research and
Development meetings Dr. Hauserman, and at that time the
other directors were present, I believe at the time it was
Mr. Lou Torano, Mr. Leo Myer, Mr. Dick Thomson, Dr. Osdene,

1920

and myself.
So we discussed we had concerns about which
projects were going to be closed and which ones were going
to be allowed to continue.
It was also discussed with a representative
from New York who came down, Mr. Fred Newman who discussed
only with the directors the kinds of projects that they
might be closing down.
Q. When you say New York, you are talking about
corporate headquarters at Philip Morris?
A. Yes, Philip Morris corporate headquarters in New
York.
Q. What position did Mr. Newman hold?
A. I believe he was Assistant Counsel.
Q. And what did he say about why the projects should be
terminated?
A. He indicated the same as Dr. Hauserman indicated.
The company did not want to have negative information in
the files concerning the addictive nature of

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nicotine or
anything having to do with animal testing.
Q. Now, this happened in 1983, correct?
A. Yes.
Q. What was your reaction by that time, by that point in
time to this, closing down of Dr. DeNoble's research?
A. A bit confused. This happened around the same time

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that it was announced that I was going to be promoted. And
at the time I think the announcement had been made when it
was closed down.
And one of the things about my promotion that I
was looking forward to was sort of opening up things more
and having more widespread dissemination of information.
So, we had quote a bit of conversation about
the implications of the company's direction with regard to
what they were willing to do or going to do.
Q. You were concerned about this?
A. Yes.
Q. Let me turn to Mr. Dunn for a second. What position
did he hold?
A. Dr. Dunn was a principal scientist.
Q. Was he a person above you in the hierarchy or below
you?
A. No, he was a person one level below; principal
scientist is below a director.
Q. And what was his reputation generally there?
A. It was excellent. For example, he was sort of the
staff psychologist. He gave psychological tests to people
who came to work for us and wrote up a report, was relied
upon to help us select people that, you know, we felt were
outstanding performers, people of that type.
He was well published and well known in the

1922

area of nicotine use and behavioral effects associated
with nicotine. And I believe he was held in high regard.
Q. Did you ever discuss with Mr. Dunn, the relationship
between smoking and disease?
A. With Dr. Dunn, yes.

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Q. And what was his view, that he told you?
A. Well, again, Dr. Dunn never -- any conversation that I had with him, indicated that smoking didn't cause disease; it was an accepted hypothesis.
Q. Did you discuss the matter of addiction with Dr. Dunn?
A. On several occasions, yes.
Q. And what did he say?
A. Dr. Dunn indicated that under the definitions as he understood them that he felt that nicotine would have to be is considered addictive.
Q. If I may?
A. Thank you.
Q. At the time Dr. Dunn, or Mr. Dunn made that remark to you that his views that nicotine was addictive, do you know what Philip Morris' public position was regarding whether nicotine was addictive?
A. I really, you know, don't recall public statements at that time.
Q. Okay. Let me turn now to another topic. Are you

1923

familiar with whole product testing?
A. Well, yes.
Q. What is that?
A. Whole product testing is the concept that any product that you are going to sell to people, that is going to be used by people, should be tested in the form in which it is actually sold.
Like with toothpaste or soaps or any consumer product.
Q. In other words, testing the ingredients alone doesn't satisfy professional scientific needs; is that right?
A. That's correct. You can test ingredients and separately they can be more or less harmful than when you put them together. And my experience at Lever Brothers was detergents and soap and toothpaste, we saw lots of incidents of that. You can test an ingredient, it would be okay, and you put it in a soap and soap would help it penetrate your skin and cause irritation.
In the final product, where it was

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all put
together, it would cause harm. But if you separately
tested them, they didn't do that.
Q. Thank you, sir. At Philip Morris did you request to
have whole product testing done on cigarettes?
A. We wished to have the final, we made modifications to
cigarettes, and the idea was that you make this

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modification and if that modification was going to be used
in a Marlboro, for example, that the modification should be
tested in the Marlboro cigarette.
Q. So, we can understand it, the jury can understand it,
you mean with respect to this whole cigarette, the whole
testing the cigarette that's marketed or cigarette that
comes out of the lab on an experimental basis?
A. The cigarette that is marketed, for instance, you can
test some of these safety features we thought we were
doing. You can test it by putting the cigarette together
with only ripe tobacco or only burly. And do a test.
You really don't know whether you made progress
until you test it in the final product you intend to sell.
Q. This was all with the purpose of trying to achieve a
safer cigarette?
A. Yes.
Q. Did you ask to have whole product testing done?
A. I actually spent a lot of time at Philip Morris under
the impression that whole product testing was being done.
Q. Who gave you that impression?
A. Dr. Osdene.
Q. Did you find out definitely?
MR. LOMBARDI: I object if we can establish a
foundation as to when he found out?
BY MR. ADELMAN:

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Q. Fair enough. When did you first learn from Dr.
Osdene that whole product testing would be done?
A. From 1977, remember I started there in '76, when I
became director of applied research and was given the
mission of getting involved in these projects,

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the issue
came of up how it was going to be tested.
Dr. Seligman was my boss at that time. And he
indicated that Dr. Osdene would take care of the testing
and I could consult with Dr. Osdene to get the results.
And Dr. Osdene indicated that the whole product advertising or the testing of the finished products would
be done in Europe or outside of the laboratory.
Q. When did he tell you that; if you know?
A. Some time in 1966. I don't remember. I mean, it was
several, every project that we had, that related to smoking
and health issue, the issue comes up with how you test to
know whether or not you are making progress, and in
reducing mutagenicity carcinogenicity of the product.
Q. Did Dr. Osdene tell you why it was that whole product
testing if it was done at all had to be done in Europe?
A. Again, yes. Because he indicated that those results
should it show that the product was carcinogenic or
mutagenicity were not desired in the files of Philip Morris
in the United States.
Q. Did he give any other reason for that?

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A. No.
Q. Did you discuss the issue of whole product testing
being done outside with anybody else at Philip Morris?
A. Yes. Dr. Seligman, Dr. Hauserman, Dr. Gaisch that I
mentioned, Mr. McCuen, Mr. Carpenter, Dr. Charles, quite a
few people.
Q. Did you learn from these discussions what the
position or policy of other cigarette companies was with
respect to whole product testing?
A. Yes, as part of -- I understood there was an
agreement they would not perform such testing on their own
products or on competitors' products, within the United
States.
Q. And who told you about this agreement?
A. Well, that's Dr. Osdene, Dr. Seligman, Dr. Hauserman,
Dr. Gaisch, Mr. McCuen, the same people.

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Q. They all said that?
A. Yes.
Q. Now, were you ever given the results of whole product testing?
A. I never saw written results that contained, other than tar and nicotine, FTC biological testing. With regard to biological testing, I was only given results verbally by Dr. Osdene as to which things were better or worse.
Q. So, are you telling us that you never received any

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results of whole product testing?
A. That's right. Not that I could look at and see that in fact it was done.
Q. Were you concerned about that?
A. Well, yes. And it was discussed not only with Dr. Osdene but with my superiors, Dr. Seligman and later Dr. Hauserman.
And the answer was that we needed to rely on what Dr. Osdene was doing and his result, the information that he had.
Q. From overseas?
A. Yes.
Q. But you never saw that?
A. That's correct.
Q. Now, what is separate ingredient testing?
A. Well, separate ingredient testing is to make sure you want to know both things. You want to know all the ingredients, whether you are putting them together and separately, because if you are putting an ingredient into a product that is not good for that product, you need to know that second, separately before you go ahead and put it in the product.
Q. Is that something you wanted to do in the course of your work there at Philip Morris?
A. Yes, because it helps you understand how the

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ingredients perform separately. And in fact that's the bulk of the work that was carried out at Philip Morris that you consider bright and burly and oriental, and the

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4 different forms of tobacco to be separate ingredients.
5 That's basically what was tested. They would
6 test the different kinds of bright, stems, different kinds
7 of reconstituted tobacco, so there was a lot of testing of
8 those specific things that went into making the cigarette.
9 Not the flavor additives and those things, but the
10 different ingredients, the blends.
11 Q. I guess I should ask you this. In your view is
12 complete, separate ingredient testing done?
13 A. No, certain ingredients were not tested.
14 Q. What were they?
15 A. Those were ingredients that were added in as
16 additives, flavors, for example, that were not tested
17 separately. They were only tested mixed in with other
18 things.
19 Q. Why should they have been tested?
20 A. Well, we had a long discussion about the reliance on
21 what's called the grass list. Grass means generally
22 regarded as safe. And it was generally devised by
23 government agencies for foods.
24 So, you could have something in the food if it
25 is grass at several levels, then you don't need to test

1929

1 it.
2 But the problem is silica, finely ground sand
3 is grass for eating. It's used in toothpaste, silica
4 bases in toothpaste. You can put it in foods. But if you
5 were to inhale that, that is not a good thing to inhale,
6 silica. It leads to silicosis.
7 So, it was my argument with Dr. Osdene that
8 reliance on the grass list was not adequate to determine
9 the safety of some of the additives that were used.
10 Q. Do you recall what he said?
11 A. Dr. Osdene didn't say very much on it, other than the
12 fact that they were going to rely on the grass list.
13 Q. All right. May I have 2292, please.
14 MR. LOMBARDI: Your Honor, I do not believe

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15 this was in the exhibits that were turned over to us.
16 He's correct.
17 BY MR. ADELMAN:
18 Q. Thank you. Have you found 2292 in your books?
19 A. Yes, I have.
20 Q. Can you tell us what that is by looking at the front
21 page?
22 A. Yes; this is a report about a particular analytical
23 method concerning one of the most potent class of
24 carcinogens, nitrosamines, in cigarette smoke.
25 Q. May I have the next page, please.

1930
1 Now, we have moved to page 2 and highlighted
2 this one sentence there, doctor. If you will focus on it.
3 You told us earlier in your testimony that the phrase
4 biological activity was used as a code word. Do you see
5 the phrase biological activity here?
6 A. Yes.
7 Q. And using your knowledge of the code, can you
8 translate that sentence?
9 A. Yes.
10 Q. -- into English if you will?
11 A. Biological activity in that context means either
12 carcinogenicity or mutagenicity. Mutagenicity is probably
13 more specific.
14 Q. Cancers?
15 A. Well, it causes changes in cells, causes mutations in
16 cells which can lead to cancer.
17 Q. Do you know why that code word biological activity
18 was used?
19 A. I think it's partially because people who are dealing
20 with issues like this, you know, don't want to see the
21 blunt word up there, carcinogenicity, mutagenicity.
22 Q. All right. On the matter of code words, was there
23 any code word, if you now, for addiction in documents?
24 A. Yes, habituation was frequently used whereas a
25 synonym for addiction.

1931
1 Q. Now, referring again to Dr. Osdene, did you ever have
2 occasion to discuss with him in general the

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controversy
regarding smoking and health?
A. On many occasions, yes.
Q. And did he describe to you his role with respect to
that controversy?
A. Dr. Osdene indicated to me on many occasions that
part of his job and one of the reasons why he was shedding
a lot of his responsibility into my directorate, that is
reducing the number of people reporting to him that
reported to me, is because he would have an increasing role
in trying to maintain the smoking and health controversy.
That is, to mount attacks against published
information that would tend to indicate that negative
things about smoking and health.
Q. What did you understand him to be telling you when he
talked about maintaining the controversy.
MR. LOMBARDI: Objection.
THE COURT: Sustained.
BY MR. ADELMAN:
Q. Let me have Exhibit 2251, please. Here is a 1981
document; have you seen this before, sir?
A. Yes.
Q. And this one has to be related to Surgeon General's
report. And I refer you to the portion of this memo

1932

written by Dr. Osdene, highlighted at the bottom. "It is
therefore vital that we take some kind of measured
countersteps to these attacks. These may be divided into
two sections." Is that the kind of thing you mean by
maintaining the controversy?
A. Yes, and it's explained more on the next page.
Q. Yes, if well, next page please.
Focusing now on the second sentence there.
"Due to the major legal problems, it would seem that such
experimentation would have to be carried outside of the
U.S., but should, in my opinion, constitute major sound
research to determine the facts in many of the
allegations."
Again, is that along the same lines?
A. That's exactly the kind of discussions

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that we had,
16 and I'm copied on this memo.
17 Q. You got this memo?
18 A. Yes; it is on the next page.
19 Q. There you are.
20 Let me ask you, sir, is this the sort of
21 defensive research you mentioned earlier in your
22 testimony?
23 A. Yes.
24 Q. Did you ever ask to learn from Dr. Osdene what his
25 personal position was with respect to the relationship

1933
1 between smoking and disease?
2 A. With specific respect to emphysema, he stated on at
3 least one occasion that I can recall very clearly, and we
4 were talking about causation, various modes of how
5 carcinogens work and how they attack the cells, and he made
6 the statement that while carcinogenesis in many cases is
7 difficult to prove, you certainly didn't have that trouble
8 with emphysema because emphysema is caused by simple
9 multiple attacks on the tissue which cigarette smoking will
10 do.
11 So, he indicated that he felt if the company
12 was attacked on the basis of cigarette smoking causing
13 emphysema, that they had very, very shallow grounds on
14 which to stand.
15 Q. What kind of grounds?
16 A. Shallow, there was no defense he could think of that
17 would, that carcinogenicity tests are very difficult to
18 perform. So, you can always second guess the guy who
19 performed the test. With emphysema, the epidemiological
20 evidence was so strong that he didn't feel he could mount
21 the same defense.
22 Q. This is Dr. Osdene?
23 A. Yes.
24 Q. Do you know what the company's public position at
25 that time was with the relationship between smoking and

1934
1 emphysema?

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A. Again, we are not -- we were not made aware of publications of the company.
Q. Referring to Dr. Osdene, at this point had you ever had any discussions with him about his personal situations regarding smoking?
A. Well, during the course of his second wife's pregnancy, we had a discussion. He had given up smoking because both he and his second wife --
MR. LOMBARDI: I object to the relevance of personal.
THE COURT: Sustained.
BY MR. ADELMAN:
Q. All right. Now, with regard to the safer cigarette, do you recall a research project involving polonium, I'm pronouncing that correctly, polonium?
A. Correct.
Q. What is polonium?
A. The specific isotope of polonium in question is polonium 210, and it is a by-product, comes in with a little bit of uranium, is in fertilizer.
And what happens is when they use a lot of fertilizer, phosphated fertilizer in growing tobacco, two things happen. Some of the uranium turns into polonium. Some of the uranium itself gets inside of the stem itself,

and other parts of it is picked up through air borne particles that stick on the surface of the leaves.
And in the late 70's, this was demonstrated by taking tobacco and washing it by Dr. Robert W. Jenkins and Dr. Mary Ellen Counts where they determined that by washing tobacco, you could wash off the part that was on the outside, about half of the polonium 210.
Q. Was this polonium project toward trying to develop a safer cigarette?
A. Yes, one of the four major concerns about smoke was that very tiny amounts of radioactive materials, should they become lodged in the lung, obviously would not be very good when in fact the radioactive particle

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decayed.
So, polonium was very concerned because it had been found on tobacco. And I believe researchers from I think it's Texas A and M had published that this might be a mechanism for causation of cancer from smoking.
Q. Was the polonium research completed?
A. Well, the thing that was done in that particular case is about 1981, Dr. Osdene's group sets up what's known as a low level laboratory. The object of that was simply to measure the radioactivity of things used in the tobacco making process and some of the tobacco itself, to make sure or try to make sure or try to reduce the incidents of those materials being used in the manufacture of tobacco

products.
Q. All right. Was that project, polonium project completed?
A. Yes, it was completed by '82 or '83. It was being used during that period.
Q. Was there ever an occasion when you met or became familiar with two assistant general counsels from the company regarding that project and its offspring?
A. Well, this, the low level laboratory and the measurement of polonium was, or the measurement of radioactive materials, wasn't necessarily restricted to polonium because other things could be picked up by this was indicated as being one of those projects of concern at the end of 1983, that potentially this project, you know, is an admission that you have bad things in the product that could cause cancer. And it might be one that they would shut down.
Q. Well, that invites some questions. First of all, who voiced the concern?
A. Dr. Osdene asked the question of Mr. Newman at the meeting that we had. And so Dr. Osdene voiced the concern

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22 about whether that project would be --
23 MR. LOMBARDI: Your Honor, this is, as I
24 understand it, a privileged conversation at this point,
25 Mr. Newman being an in-house lawyer for Philip Morris.

1937
1 MR. ADELMAN: Could we be heard, your Honor, at
2 the bench.
3 THE COURT: Yes.
4 (The following discussion was conducted at the
5 side bar between court and counsel, out of the hearing of
6 the jurors, as follows:)
7 MR. ADELMAN: If I may approach, your Honor.
8 He will testify that this meeting, the lawyers,
9 the in-house lawyers from the company told him, as he is
10 suggesting here, that this project should be stopped
11 because it would show things that would cause them to have
12 civil liability.
13 It seems to me under the issues, the court
14 would be well within its balance to find that this comes
15 under the crime fraud exception; that the attorney/client
16 privilege wouldn't apply here.
17 THE COURT: You want to respond?
18 MR. LOMBARDI: I don't think we are in the
19 territory of the crime fraud exception here, your Honor.
20 There was a series of requirements that have to be met.
21 And simply coming up and saying in the middle of testimony
22 this falls under the crime fraud exception is not
23 sufficient to carry that burden.
24 MR. ADELMAN: If I may, your Honor, it seems to
25 me two attorneys from the, coming down and telling them to

1938
1 stop research on the grounds it might result in liability.
2 In other words, the true facts being suppressed and
3 suppressed in order to keep the company from being sued
4 borders on crime and certainly fraud.
5 THE COURT: Well, just a couple things. Have

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you made a record on this, and if you did in discovery on this issue, do we need to voir dire briefly what the circumstances were?

MR. COUGHLIN: I don't think you do, your Honor. I think they know the foundation of this witness's testimony. They know what he's going to say. They know that he believes they were prevented from doing stuff because of the lawyers. The lawyers were involved in the operations of the business. So, right there that -- that waives the privilege.

THE COURT: The one question I think specifically is, was this more of a managerial decision in terms of --

MR. COUGHLIN: Managerial.

THE COURT: I think they are at a disadvantage if some attorney was interested in research, then attempted to secret evidence or perpetrate a fraud.

MR. ADELMAN: If I may, your Honor.

THE COURT: Let me do this. Why don't we deal with what he actually says.

1939

(The following proceedings were conducted in open court.)

THE COURT: We are going to take -- you'll need to go back to the jury room. Don't go anywhere, leave the pads face down, and we'll come get you as soon as we can.

(The jurors withdrew from the courtroom and the following proceedings were conducted in open court:)

VOIR DIRE EXAMINATION

THE COURT: Do you want to relate again what the circumstances of this conversation were?

THE WITNESS: I talked earlier about the conversation.

THE COURT: Talk into the microphone.

THE WITNESS: Sorry.

We had this meeting to discuss why Dr. DeNoble's project was closed down. And this is the same meeting that we talked about earlier, where a

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meeting was
18 called to explain. We had two meetings. One
was by the
19 Vice President of R and D which was Dr. Max
Hauserman, and
20 the Director, the second meeting was Mr. Fred
Newman came
21 from New York City for the purpose of
explaining to us why
22 the project was shut down, Dr. DeNoble's
project.
23 During the course of that meeting
Dr. Osdene
24 inquired as to what other kinds of projects had
been shut
25 down, and this came up as being one of those.

1940
1 THE COURT: Okay, and what do you
say occurred
2 in terms of the conversation.
3 THE WITNESS: Dr. Osdene asked when
other
4 projects would be shut down. The answer was
yes, probably
5 will. He said like what? As far as I can
recall, there
6 was some conversation back and forth.
7 And I remember this one being
brought up as
8 well: Does that mean that this project for
measuring
9 radioactivity should go on or not go on? At
that
10 particular point it was said, well, it may be
one, but we
11 don't want to keep going.
12 THE COURT: Do you want to make any
other
13 inquiry?
14 MR. ADELMAN: If I may.
15 Q. Doctor, was there any discussion during
this meeting
16 about the civil liability concerns?
17 A. No.
18 THE COURT: Okay. We'll --
19 BY MR. ADELMAN:
20 Q. Was there any discussion about whether
completing a
21 project such as this would cause the company to
be subject
22 to lawsuits?
23 A. No, just a question of what the company
was going to,
24 what projects was going to be allowed and not
allowed.
25 THE COURT: Okay, why don't you get
the jury,

1941
1 and I'll sustain.
2 MR. ADELMAN: Your Honor, may I ask
him one

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more question?
THE COURT: I think he's answered twice the
questions where you led him.
MR. ADELMAN: Well, if I may with the court's
permission.
THE COURT: Go ahead and ask.
BY MR. ADELMAN:
Q. Yes. Did Mr. Hauserman say anything about the matter
of liability?
A. Dr. Hauserman?
Q. Yes, sir?
A. Well, indicated, as I said earlier, that we were
concerned about which projects were going to be shut down
because of the not having the negative information, the
same as for the DeNoble project.
Q. What's the negative information?
A. Well, in the case of the DeNoble project, the
negative information is showing that nicotine is addictive.
In this project it's -- the negative information is showing
that your product contains radioactive materials.
Q. If I may, why would it be negative to the company?
A. Because it would be an indication or direct proof
that your product contained radioactive materials, which

are known to cause cancer.
THE COURT: Again, what was the status of the
investigation at that time?
THE WITNESS: It was up and running.
THE COURT: Had you gotten any results yet?
THE WITNESS: My understanding from Dr. Osdene
was they had already removed some products from use that
would otherwise have been used if they hadn't had that.
THE COURT: Okay, I still would find that there
is, the plaintiff has failed to establish the crime fraud
exception of the privilege rule. So, I'll sustain the
objection of the defendant as to this conversation.
MR. ADELMAN: Very well.
(The jury was returned to the courtroom and the
following proceedings were conducted in open

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court:)
THE COURT: Mr. Adelman, if you will continue.
MR. ADELMAN: Thank you, your Honor.
Your Honor, ladies and gentlemen.
Q. Doctor, can you tell us what the NOD project was there at Philip Morris?
A. The NOD stands for naturally occurring denitrofication. And it was one of three projects where the intent was to reduce nitrate in tobacco because the nitrate produces oxides of nitrogen, which then interact with alkaloids like nicotine, which work to form

1943

nitrosamine, which are one of the most carcinogenic forms of smoke.
THE COURT: Could you pull your microphone a little closer.
Q. All right. Was that project conducted in your division?
A. The naturally occurring denitrofication was conducted in my division. There were two other projects electrodialysis project was conducted in Dr. Gannon's division. And there was one in Europe called NINO, N-I-N-O, but they were all methods referring to removing nitrates from tobacco.
Q. Referring to project NOD, was that project completed?
A. In my opinion it was completed twice. The first time was in approximately 1980. Patent was applied for in 1979, and then work continued past that point. And then another patent was applied for I think in the '83, '84 time frame.
Q. What were you told about by the management, Mr. Seligman and Mr. Hauserman and so forth about project NOD and it's future?
A. Well, basically the issue came up in the 1980 time frame about whether the costs of doing this. So, we had an independent study done by a person in the administrative area with an engineering background in order to determine the costs of the three different processes for removing

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nitrate.
I was told by Dr. Osdene that was one of the instances where he showed me data from Europe which tended to indicate that the project was successful. This was being applied for reconstituted tobacco, the reconstituted leaf, where they were already removing 90 percent of the nitrate.
But 90 percent wasn't good enough to prevent significant mutagenicity in testing. So, the object was to remove 99 point 99 percent of the nitrate.
It appeared that it worked, that is, it removed the nitrate. It appeared you put the material made from this process in cigarettes, you could smoke them and they were acceptable to panels, and it appeared that the cost was eminently affordable.
Q. Well, you were told that it was too costly, right?
A. Yes, but the report tends to indicate that it was not too costly.
Q. Whose report are you referring to?
A. The report was done by Susan Dobberstein.
Q. And may I have 2228, please. Is this the cover page there of the Dobberstein report?
A. Yes.
Q. And moving on, sir, to page two, there are highlighted portions there. This generally describes the

research?
A. Yes, it does. First part says that it reduces NOS deliveries. NOD was better than the other two anaerobic or electro dialysis process.
And it also, second part there, that you have lower total particulate matter VOCO, that's carbon monoxide; CN hydrogen cyanite; and alkaloid thanethercal, which is what they were currently using or second generation RL.
Q. Are there references further in the report to the cost issue?
A. Yes.
Q. Could we have those, please?

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14 A. The next one shows you the internal smoking panels
15 found no differences between the control and test
16 cigarettes at 19 percent RL levels. So, you could put
17 quite a bit of this stuff into a cigarette and still not
18 alter the taste.
19 Q. Here we have a page that talks about a table
20 summarizing the capital investment required to install
21 commercial scale process for line 3-B, and then we'll move
22 ahead.
23 Here is a table talking about summary of
24 capital costs and so forth. Without going through all the
25 details, did this establish a cost that was reasonable

1 from your perspective?
2 A. From our perspective, the cost ranges from 48 million
3 to 65 million dollars, which is much less than a penny a
4 pack, about a penny a pack. So, in terms of the cost of
5 implementing this seemed reasonable. Nevertheless, we were
6 asked to develop the process further.
7 Q. All right. Who said that the costs were excessive?
8 A. Well, that's Dr. Seligman, Mr. Resnik, and a quite a
9 few people that was sort of the decision that came from New
10 York City, from the headquarters.
11 Q. My question is, and perhaps I've asked a bad
12 question, did the project continue, was it funded again or
13 did it stop?
14 A. It continued.
15 Q. Did it ever end?
16 A. I think it did end after we produced the second
17 process, which I think resulted in the '83, '84 patent
18 application, it was terminated some time in the mid-80s. I
19 don't remember the exact time.
20 Q. Do you remember who terminated it?
21 A. No, I don't.
22 Q. Do you know why it was terminated?
23 A. It was terminated because of the cost of doing this.
24 Q. Do you agree now that the cost of doing it was
25 excessive?

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1947

A. I didn't agree at the time and don't agree now.
Q. For the reasons you have stated?
A. Yes, it seems in terms of other processes that were implemented very quickly, for example, like laser perforation where we put lots of holes in paper, saved 30 million up to 60 million dollars a year.
That was implemented in 10 to 11 months after we discovered it. This one went on through virtually my whole career that I was there.
Q. What did you conclude about that stretching it out?
A. My conclusion was it was a lot easier to get a project through that saved money than one that reduced the safety of the cigarette.
Q. Did you ever hear the phrase paralysis by analysis?
A. Yes, I did.
Q. In what context?
A. It was a favorite saying of Mr. Cliff Goldsmith who was the President of Philip Morris, Inc. during the portion of the time that I was there. And he was always chastising us on some projects for taking too long by analyzing it to death. And I kind of used that phrase in response to my management with discussing this, because it seemed like rather than implement it, especially whether you have an indication as good as this, that we would continue to analyze it and avoid the issue of spending the money to do

1948

it.
Q. Is this example that you are talking about NOD project that you were talking about, analysis paralysis by analysis in your view?
A. Yes, in my view.
Q. With respect to Mr. Dunn, I wonder if we could put up Exhibit 1054. In your book it is 850. Counsel, it is 850 as well as 1054.
Now, this is a document --
MR. LOMBARDI: Your Honor, excuse me. This is

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a document that precedes the witness's time with the company.

MR. ADELMAN: That's exactly right, and I want to get to one point and ask him about it. Counsel is correct.

If you will, this is a document, I think, authored in 1972. There is a highlighted portion further on I'm going to ask you about.

Actually, on the next page of this, yes, here we are, this is page 5 of the highlighted portion. If you will, sir, says: "A cigarette should be conceived not as a product but as a package. The product is nicotine. The cigarette is but one of many package layers." And then moving on, "Think of a cigarette pack as a storage container for a day's supply of nicotine. Think of the

cigarette as a dispenser for a dose unit of nicotine."

Now, recognizing that this was written and created by Mr. Dunn in 1972, the question is this; did he ever say these things to you?

A. Yes, this is well known to be Dr. Dunn's view views on nicotine, being the reason and the only reason why, well, you can reinforce nicotine, but being the main reason for people smoking going back to, we discussed while I was there the issue that in the 50's people had tried to sell a cigarette without nicotine in it.

It was called Sano, and a kings Sano version. Both of those were denicotined cigarettes, and they did not sell. And this is a discussion that we had many times, that nicotine is why people smoke.

Q. And Mr. Dunn said these things that appear in this exhibit?

A. Yes.

Q. Thank you.

Exhibit 2183, please, if you will. Exhibit 2183, it's a memo from Mr. Osdene August 12, 1980, talking

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about evaluation of major R and D programs, and moving down to the bottom, nicotine program; do you see that?

A. Yes, and I received a copy of this memo.

Q. All right. The memo you received says "This program includes both behavioral effects as well as chemical

1950

investigation. My reason for this high priority is that I believe the thing we sell most is nicotine."

Did you discuss that particular point, the thing we sell most is nicotine, with Dr. Osdene?

A. Yes.

Q. Did he say that to you?

A. Yes, and as I say, no one there while I was there indicated that anything different when they said nicotine is what we are selling, and we manipulated nicotine in the product to make sure that we maintained it.

Nicotine is what cigarettes is all about, nicotine and the effects of nicotine in combination with the other ingredients.

Q. So, what you are saying now this same some point was encoded in the other statements of other people who worked there?

A. Yes.

Q. Did anybody say anything to the contrary?

A. No, not that I can recall.

Q. Now, moving on, sir, regarding your colleagues at the research center down there in Richmond, for the time that you were there, was there any discussion as to whether nicotine was a drug?

A. Yes.

Q. What was the view?

1951

A. Well, the drug is something which has pharmacological physiological effects. Alkaloids are drugs, and nicotine is an alkaloid. And it's a drug. And the view was that we studied these materials, in the same manner that drug companies study their products. So, it's a drug.

Q. Well, I just want to be sure you are telling us what

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7 the position or statements were of the staff people there
8 and the management. Is that what you have done?
9 A. Yes, that's what I've done. We have had testing in
10 rats, we had testing outside. We had structure activity
11 analysis. We synthesized analogs. We recognized it was a
12 drug. And we developed alternatives to the drug called
13 nicotine analogs.
14 And we discovered and developed ways of better
15 understanding how the drug worked through Dr. DeNoble's
16 work. So, it's a drug.
17 Q. All right. What was the view of the staff,
18 management there as to whether nicotine was an addictive
19 drug?
20 A. I indicated earlier there were a lot of discussion
21 about people formulating reasons why it shouldn't be called
22 that, but no evidence was ever proposed or stated that
23 was -- that stated bluntly, okay, on the basis of this we
24 can refute the hypothesis that nicotine is an addictive
25 drug.

1952
1 Q. Can we have Exhibit 1858, please.
2 This exhibit was copied to you from Dr.
3 Gullotta, do you know who he is?
4 A. Yes.
5 Q. Who's he?
6 A. Dr. Frank Gullotta did work on electroencephalograph
7 studies of smoking, that is, brain wave patterns that are
8 generated when people smoke.
9 By the way, when I received this document,
10 there was never any document that I received that had
11 attorney work products on it, so.
12 Q. Moving ahead to the contents of the document here,
13 can you summarize what this finding is and what
14 significance?
15 A. Basically it's, what you are trying to do is
16 determine dose response. All drugs have a dose response.
17 The more you give people penicillin for folks, you need to
18 know how much, or aspirin, you need to know how much to

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give before it is effective. This is a dose response study on nicotine.
Q. All right. Let me put up Exhibit 3772, please. Let me ask you just these questions.
3772 is --
MR. LOMBARDI: Objection, your Honor. This is plainly outside the time period that the witness was

1953

employed by Philip Morris. And it looks to be a newspaper article or a Cable News Network report on certain hearings before the House, which would be hearsay.
MR. ADELMAN: On that level, it comes in as an admission to the court, please. We concede this is a 1994 document. We simply want to ask the witness about it.
THE COURT: That's, I don't think, beyond his time there. So, it may be admissible for on other grounds, but I don't know what the purpose would be of asking this witness when he left the company that many years prior.
MR. ADELMAN: All right. We'll proceed.
Q. All right, Sir, let me turn to another topic here. And by way of doing that, let me ask you whether you came to know a person there at Philip Morris by the name of Myron Johnston?
A. Yes.
Q. Who was Myron Johnston?
A. Mr. Myron Johnston worked in the consumer testing area. He worked along with some of the behavioral research people. But his main area of expertise was in analyzing demographic profiles of smokers, that is, who used cigarettes and what they thought about using them and things of that sort.
Q. Those profiles made available you from time to time?

1954

A. These were reports that were provided to me, discussions that took place at meetings that we had,

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including Mr. Johnston was one of the favorite speakers for our monthly Richmond meetings, where the senior management from New York, President of Philip Morris USA, sometimes the officers of Philip Morris Incorporated would come down to hear what we were doing at the Research and Development center.

And Mr. Johnston would frequently, maybe once a year, twice a year, give talks on demographics of smokers.

Q. Did some of those talks, some of those demographics refer to smoking by children, by people under 18?

A. Yes, they did.

Q. All right. Now, what was Mr. Johnston's reputation in the company, as far as you knew?

A. He had a very good reputation. He had a lot of more contacts than the rest of us did with people in marketing in New York. And as I indicated, when the marketing people might be coming to Richmond or -- we provided the agenda the directors would talk to the vice president about the agenda for the upcoming Richmond meeting, they have one every month, the management would come down from New York, and there was always a great interest when Mr. Johnston gave his talks because he felt they were important to understanding who the users of the product were.

1955

Q. Let me have displayed for you Exhibit 2504. Now, before you is Exhibit 2504, a memo from Mr. Myron Johnston to Mr. Jon Zoler.

What department did Mr. Zoler work in?

A. He was in the marketing group in New York.

Q. To the marketing.

Now, moving farther on here, there is on page two, here parts which are highlighted having to do as a highlighted part, the people starting smoking before age 18. Did you receive this memo while you were at Philip Morris?

A. This is the continuation of, yeah, I've

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seen this.
13 This is continuation of presentations that were made as far
14 back as 1981 that were talked about. So, this is like two
15 years later. This is about a two year sequence.
16 Q. All right. Let's talk just for a moment or have the
17 court understand these presentations were the occasions
18 when Mr. Johnston would speak to people from Richmond and
19 also from New York?
20 A. That's correct.
21 Q. And you attended them?
22 A. Yes, as a director, I attended the so called Richmond
23 meetings where the senior management from New York came.
24 Q. During these Richmond meetings Mr. Johnston would
25 speak, was the matter discussed or displayed about research

1956
1 or information about people under 18 and their smoking
2 habits?
3 A. Yes, it was.
4 Q. Is this an example of such a display?
5 A. Yes, and there is much more I believe, but yes.
6 Q. Did anybody stand up during these meetings and say,
7 hey, don't do that? We don't want that information?
8 A. No, they did not.
9 Q. What was the level of senior management that were
10 there for these presentations if you recall?
11 A. You mean, senior management usually at these meetings
12 would include President of Philip Morris USA, and some
13 senior official from Philip Morris, Incorporated, and for
14 these meetings usually the Vice President of Marketing.
15 Q. Can you give us some names?
16 A. Vice President of Marketing, 1981 time frame was
17 James Morgan. The 1983 time frame was Bill Campbell. The
18 President of Philip Morris USA was Shep Pollock at that
19 time, the senior Vice President Wally McDowell. Senior
20 Vice President of operations who came down from New York
21 and frequently either Mr. Goldsmith, Hugh Cullman, who was
22 the CEO of Philip Morris USA.
23 Q. So, we can be sure and be fair you are not

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clear that
24 any one of these individuals were present at any one of
25 these meetings as an individual. You can't pinpoint one

1957
1 meeting, one individual?
2 A. That's right; I can't.
3 Q. You know generally management level was there?
4 A. Yes.
5 Q. Were there discussions by Mr. Johnston or anyone else
6 about patterns of smoking of people under 18?
7 A. Yes, there were.
8 Q. Can you tell us about those?
9 A. Well, they would be the basic conclusion which you'll
10 find in many memos, was that Marlboro brand was sort of key
11 to the future of Philip Morris. And that brand was the
12 brand of choice among young smokers, that is, smokers
13 before the age of 18.
14 And the chart, for example, on that you have up
15 there right now shows the median age at which people began
16 to smoke, if they were not a high school graduate, was 16.
17 And median means half the people who smoke start smoking
18 before that age.
19 Q. Now, you are telling us what was said at the meeting
20 by Mr. Johnston and others?
21 A. Yes.
22 Q. Did anybody at any of these meetings when teen
23 smoking was discussed stand up and say, stop it; we don't
24 want to hear it?
25 A. No.

1958
1 Q. Exhibit 2279, please. Do you recognize 2279 from
2 this front page?
3 A. Not from the front page.
4 Q. All right. How about the inside cover page?
5 A. Yes.
6 Q. All right. Did you receive a copy of that, that's
7 dated March 31, 1981?
8 A. Yes, and I was referring a little earlier to
9 precursor to the '83 memo, and this is the report.
10 Q. Again, it is authored by Mr. Johnston?
11 A. Yes.

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Q. And moving into the document itself, which is entitled Young Smokers Prevalence, Trends, and Implications and Related Demographic Trends, let's look further on.

It states, "It is important to know as much as possible about teenage smoking patterns and attitudes. Today's teenager is tomorrow's potential regular customer, and the overwhelming majority of the smokers first begin to smoke while still in their teens. Smoking patterns of teenagers are particularly important to Philip Morris."

Was that subject discussed verbally by the people at the meeting?

A. Yes, it was.

Q. By Mr. Johnston?

A. Yes.

1959

Q. And by other people there?

A. Yes.

Q. "Furthermore, it is during the teenage years that the initial brand choice is made. At least part of the success of Marlboro Red during its rapid growth period was because it became the brand of choice among teenagers who then stuck with it as they grew older -- this combined with the rapid growth in the absolute number of teenagers."

Again, was that something Mr. Johnston said at the meetings?

A. Yes, this was a very key meeting which the tables were going to be set up.

Q. You were at the meeting?

A. Yes, I was.

Q. You recall this particular being discussed?

A. Yes I do.

Q. The tables that you referred to, let's look at those, please.

Here under the heading teenage smoking prevalence, of the tables. Right down breakdown smoking all the way down to age 12; is that correct?

A. Yes.

Q. Were these tables discussed at the meeting?

A. I specifically remember table two. I

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don't
25 specifically remember table one.

1960
1 Q. That's percentages of 15 to 18 year olds who were
2 regular smokers.
3 BY MR. ADELMAN:
4 Q. May I have Exhibit 2123. Are you familiar with this
5 exhibit?
6 A. Yes.
7 Q. Okay. Did you receive a copy of it while you were
8 there?
9 A. Yes, I was involved in helping Dr. Seeman with part
10 of his studies on who worked for Dr. Sanders at the time,
11 the studies on nicotine analogs.
12 Q. It would help everybody. You were talking about
13 analogs, right?
14 A. Yes.
15 Q. Were analogs used or experimented with?
16 A. Yes, the ideas, it indicates there nicotine has two
17 effects. One is on the central nervous system. The other
18 on the peripheral nervous system.
19 The peripheral effects were related more to
20 increasing heart rate and things of that sort. So, the
21 idea was to develop a chemical that would behave like
22 nicotine, but would not have the effect on your heart rate
23 and on your blood vessels as a constriction.
24 Q. Was that completed?
25 A. Many such candidates were developed, and there was

1961
1 also a project to develop an analog menthol cigarette. A
2 product was purchased from the Wilkinson Sword Company,
3 that was a menthol and analog that was completed and used
4 in a product.
5 The nicotine materials, as far as I understand,
6 were not, at the time I was there anyway, directly used in
7 a product.
8 Q. Were they used in any other way?
9 A. Well, it's interesting that a lot of these analogs
10 are, there is a chemical called pyridine and they are
11 pyridine derivatives, and pyridine compounds are also known

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as flavorants.
And it was recognized by Dr. Seeman and Dr. Sanders that a lot of the compounds that, for example, occur when you react sugar and amino acids and protein in sugars, would have the same structures as the compounds that serve as nicotine analogs.
So, a significant amount of effort was applied toward developing flavor products that had the same chemicals in them. So that the flavor, the flavor compound would in essence behave as a nicotine analog.
Q. Finally, sir, were additives used by Philip Morris at the time you were there?
A. I didn't.
Q. Were additives used?

1962

A. Yes.
Q. Were they tested to your knowledge?
A. Not separately.
Q. Should they have been?
A. In my opinion, yes.
Q. And why is that?
A. Again, I believe that you need to know whether the additive in and of itself creates a significant risk to the consumer, then you can determine whether you want to put it in your product.
If you make some other change in the product that has an untested additive in it which otherwise might have decreased the mutagenicity of that product, you might not tell if the additive was causing a bad affect.
Q. Did you make that concern of yourself made known to anybody there?
A. Yes.
Q. What were you told?
A. That it was being tested.
Q. Was that true?
A. I don't know.
MR. ADELMAN: That's all I have, your Honor.
THE COURT: Cross examination.

CROSS EXAMINATION

BY MR. LOMBARDI:

1963

Q. Doctor, and good afternoon, ladies and gentlemen of

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the jury. For the record, George Lombardi on behalf of Philip Morris.

Dr. Farone, biological activity is a code word?

A. Yes.

Q. Code word used by Philip Morris?

A. Yes.

Q. And, as far as you know, that code word was used because Philip Morris didn't want to use other words; is that right?

A. Because in print mutagenicity, teratogenicity, carcinogenicity, it didn't look quite as good.

Q. Are you aware of any other people or organizations that you use the same code word biological activity?

A. Well, you could use it in other respects, I know folks you can say --

Q. Can you answer my question, sir? I asked you if you know of any other organizations that use that term?

A. Yes, I do.

Q. Would the Surgeon General of the United States be an organization that uses the code word biological activity?

A. I mean, Surgeon General could use it, the FDA could use it, almost anybody could use it.

Q. Do you, did you know, does the Surgeon General of the United States use biological activity which you have

described in this courtroom as a code word used solely by the tobacco industry?

A. I didn't say it was used solely by the tobacco industry, did I?

Q. Are you aware, do you know as you sit here today, whether the Surgeon General of the United States uses the term biological activity, the code word that you just described as being used, company word you just described as being used at Philip Morris?

A. No, I do not.

Q. I have here the 1979 Surgeon General's report, sir, that was while you were at Philip Morris; is that right?

A. That's true.

Q. See this chart at page 14-114 of the 1979

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Surgeon
15 Generals report?
16 A. Yes I do.
17 Q. Makes reference to biological activity?
18 A. Yes.
19 Q. Thank you.
20 Have you looked at the 1981 Surgeon
General's
21 report, sir?
22 A. I did.
23 Q. Did you note they used the term biological
activity
24 there too?
25 A. I don't recall it right now, but I'm not
surprised if

1965
1 they did.
2 Q. Let me show you page 25 of that report.
Do you see
3 that there?
4 A. Yes, I do.
5 Q. Does that refresh your recollection that
the Surgeon
6 General uses what you described as a code word
biological
7 activity?
8 A. Yes.
9 Q. Now, do you recall testifying that Philip
Morris was
10 reluctant to use the term addiction in-house; do
you recall
11 that?
12 A. Yes.
13 Q. Are you aware of any other organizations
during the
14 time that you were at Philip Morris that were
reluctant to
15 use the term addiction?
16 A. Yes. Some of the reports which showed
dependence
17 would use the word dependence rather than the
word
18 addiction. They would use, I believe, the 1980
APA report
19 uses the term dependence in place of addiction.
20 Q. The APA, so the jury knows, is the
American
21 Psychiatric or Psychiatrist Association; is that
right?
22 A. That's right.
23 Q. And they published something called the
Diagnostic
24 and Statistical Manual of mental disorders; is
that right?
25 A. Yes.

1966
1 Q. And let me just show you this. It's the
cover and
2 I'll move in.
3 Do you know that the third edition
of the

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Diagnostic and Statistical Manual of Mental Disorders was published in 1980?
A. Yes; yes, I do.
Q. Let me just show you that. Do you see that?
A. Yes.
Q. Sir, you are aware, are you not, that the word addiction is not even in the index of the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders?
A. I am.
Q. And you are aware that the word addiction is not even in the glossary of this volume. Diagnostic and Statistical Manual of Mental Disorders. You are aware of that, aren't you?
A. That's right.
Q. Are they afraid of the word addiction too, sir?
A. Yes.
Q. Sir, let's go back to when you first started at Philip Morris -- 1976 to '84 was your time frame at Philip Morris; is that right?
A. That is right.
Q. When you first started off I think you said you had

1967

position of assistant or associate principal scientist; do I have that close?
A. That's correct.
Q. And then you moved to Director of Applied Research; is that right?
A. That's right.
Q. And held that job from 1977 to 1984?
A. Yes.
Q. Okay. Now, from 1977 to 1984 there were other, there were other directorates in the R and D department; is that right?
A. That is correct.
Q. There was a directorate called process development?
A. Not in the beginning, but later, yes; there was.
Q. And directorate called product development?
A. Yes.
Q. A directorate called administrative services?
A. That's correct.
Q. And you said there was a directorate that

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changed
20 names over time and was known as research at one point and
21 biological chemical research at one point?
22 A. And some extramural studies in it at some point, yes.
23 Q. And all of these directorates were over the overall
24 aegis of the R and D Department at Philip Morris?
25 A. Correct.

1968
1 Q. And they reported to the Vice President of R and D,
2 you and your other directors reported to the Vice President
3 of R and D at Philip Morris; is that right?
4 A. That is correct.
5 Q. Now, sir, in fairness, isn't it true that much of
6 what you testified to today happened in directorates other
7 than your own?
8 MR. ADELMAN: Object to the form of the
9 question as vague, your Honor.
10 THE WITNESS: I'm not sure, I mean.
11 Q. Well, for instance, for instance, Dr. Victor Denoble,
12 you made reference to him?
13 A. Yes.
14 Q. You were not his supervisor, were you?
15 A. That is correct.
16 Q. You made reference to Myron Johnston?
17 A. That is correct.
18 Q. You were not his supervisor, were you?
19 A. That is correct.
20 Q. You made reference to biological research?
21 A. Correct.
22 Q. You were not responsible for biological research,
23 were you?
24 A. That is correct.
25 Q. You made reference to, I think you called him, Dr.

1969
1 Dunn sometimes and Mr. Dunn, or counsel, I want to go with
2 what you are comfortable with. What is it, Mr. or doctor?
3 A. Doctor.
4 Q. Dr. Dunn, you were not his supervisor, were you?
5 A. I was not.
6 Q. You were not responsible for INBIFO?
7 A. That is correct.
8 Q. Research on acetaldehyde was not done in your
9 department?
10 A. That's correct.
11 Q. Work concerning the, as you put it,

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maintenance of
the controversy was not done in your department?
A. That is correct.
Q. Work concerning whole product testing was not done in
your department?
A. Was it done?
Q. I said work concerning whole product testing was not
done in your department, was it?
A. No; we didn't do any.
Q. Work concerning nicotine analogs was not done in your
department, was it?
A. Toward the end it was, yes. Dr. Seeman of the
organic chemical people, I think, in 1983 to '84 were
transferred into my department.
Q. Carolyn Levy's work was not part of your

1970
responsibility in applied research?
A. That is correct.
Q. Frank Gullotta's work was not your work in applied
research?
A. Correct.
Q. What you were responsible for, sir, in large part was
the development of a safer cigarette; is that right?
A. About 80 percent of my time, I think, yes.
Q. Your mission as the head of the direct, the applied
research directorate was to find a safer cigarette; is that
right?
A. That was one of the main missions, yes.
Q. To work to develop a safer cigarette?
A. Yes.
Q. And 20 percent of your time was spent on acquisitions, but 80 percent of your time was devoted to
that goal?
A. That's right.
Q. You were working to find ways to reduce the risk of
smoking; is that right?
A. That is correct.
Q. And that was a worthwhile objective; wasn't it?
A. It was, yes.
Q. And it was a worthwhile objective for Philip Morris
to be pursuing, wasn't it?

1971
A. Yes.
Q. And they hired you and paid you money to take that
position with the goal of helping to find a safer

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cigarette; isn't that right?
A. That's correct.
Q. Now, there were people who worked for you in applied research, correct?
A. Yes.
Q. About 200 or so by the time you got to the end?
A. Yes.
Q. Number varied over time, I'm sure; is that right?
A. That's correct.
Q. Now, of those people, those people spent even more than 80 percent of their time trying to develop a safer cigarette; isn't that right?
A. Yes, they did.
Q. Some of those people spent a hundred percent of their time trying to develop a safer cigarette?
A. Correct.
Q. And Philip Morris hired those people and paid those people money to come to Philip Morris and work on the development of a safer cigarette; is that correct?
A. That is correct.
Q. The people working in other directorates within the R and D Department, those people in the other directorates,

1972

they were also working on safer cigarettes to some extent or another, isn't that right?
A. Well, I think that's true in Dr. Osdene's directorate, but I'm not sure of the maybe a little about it in the processing area.
Q. Okay. You were proud of the work you did at Philip Morris; is that correct?
A. Yes, I was and I am.
Q. You were proud of the work that you and your colleagues did; is that correct?
A. That's correct.
Q. You believed that the work you were doing was in the best interests of Philip Morris' customers?
A. Yes, I do.
Q. You believe that the work that you were doing served the interest of the medical and scientific communities?
A. It was a step in the right direction.
Q. You believed that the work you were doing to try to reduce the hazards of smoking served the public health?

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A. Yes.
Q. Now, sir, you did not leave Philip Morris because you were some unhappy with what the company was doing, that you quit in disgust; is that right?
A. That is correct.
Q. You were fired?

1973
A. Correct.
Q. Let's talk about that for a minute.
And as I understand your testimony, in December of 1983, you were told that you were going to be promoted; is that right?
A. I don't remember the exact time, something around that time.
Q. And we'll say the end of 1983?
A. Yes.
Q. And your promotion was going to be to the position of Vice President of Research and Development; is that correct?
A. That is correct.
Q. And the Vice President of Research and Development is the number one person at Philip Morris on the R and D side; is that correct?
A. Well, within Philip Morris USA, that's correct. I'm not sure about Philip Morris Incorporated overall.
Q. I'll take Philip Morris USA then?
A. Okay.
Q. It's the number one person in Philip Morris USA for purposes of R and D; is that correct?
A. That is correct.
Q. And when you were told that you were going to be promoted to Vice President of R and D, I take it you were

1974
excited about that?
A. If you recall my testimony, I was concerned such an announcement would be made without the actual promotion because I was concerned that many things could change between the time of the announcement. But, yes, in general I felt that that would be a recognition that the way we were operating the things we wanted to do would continue sort of unabated and maybe actually improve.

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Q. Are you saying that you are the only reason you were excited about going to Vice President is because certain programs would continue?
A. One of the main reasons for being excited is because when you spend that much time doing work, you want to see the work go all the way, end up in products, end up in fruition.
So, that's part of the excitement. That is a significant fact in a scientist's life is working on material that is good. We just talked about how I was very proud of the work that we were doing. I was proud of the, work that the people working for me did. And if we could in fact get those things into products, that's a step above just doing it.
So, in other words, I would have more influence over putting these things in products.
Q. Sir, weren't you happy for yourself, weren't you

1975

proud that you had been asked to become the Vice President or indicated that you would probably be asked to become the Vice President of Research and Development?
A. Of course.
Q. It meant prestige, didn't it?
A. Well, yes, I suppose within that local community, I'm not so sure that, you know, being, doing research in Philip Morris is not necessarily a prestigious position.
Q. Being Vice President of Research and Development is more prestigious than being a bench scientist?
A. Yes.
Q. You were in charge of 600 people or so?
A. Yes, would have been.
Q. Did it also, mean, sir, that you would be paid more?
A. Probably. I mean, that's one expectation you have. No one talked about increase in salary. That was never even mentioned.
Q. And in fact, sir, not long after you heard from Mr. Hausermann that you might be the Vice President of R and D, you and your wife bought a house in

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Richmond, a
bigger house in Richmond, didn't you?
A. No, my wife did.
Q. Well, were you going to live with her?
A. Yes, but we have a --
THE COURT: That's the way it usually happens.

1976
THE WITNESS: It's very important point. We have a prenuptial agreement where she has to own the home. I can't. So, it was her house; it was her salary that was on the line for buying the house. All I could be was a co-signer on the note to the house.
Q. I'm not going to ask you about the prenuptial agreement. But you and your wife bought a, or your wife bought a bigger house in Richmond; is that right?
A. Correct.
Q. Now, at some point you learned that plans had changed at Philip Morris and you were no longer going to be promoted to Vice President of R and D; is that right?
A. Yeah, after my wife had filed an EEOC complaint.
Q. I want to cover that. Let's go back to that, because some time around the time when you got your promotion your wife or you were told about your possible promotion, your wife was told about a possible promotion as well; is that right?
A. That's correct.
Q. And your wife didn't get the promotion; is that right?
A. That is correct.
Q. And she filed what's called an EEOC complaint against Philip Morris; is that right?
A. That's correct.

1977
Q. Now, your wife had been at Philip Morris for a number of years; is that right?
A. 19 years.
Q. And she worked in the stemmery I think you said?
A. Well, she was assistant manager at the time of the green leaf stemmer, yes.
Q. Okay. Now, some time after your wife

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filed the EEOC
complaint you found out that you weren't getting a promotion; is that right?
A. That's correct.
Q. And you thought that you weren't getting that promotion because of your wife's claim; is that right?
A. Yes.
Q. Okay. And so what you did at that point, after having various discussions with Mr. Hauserman is you retained an attorney; is that right?
A. Yes, I sought an attorney's advice based on Dr. Hauserman's advice to do so, yes.
Q. So, you are saying that Dr. Hauserman told you to seek an attorney so that you could look into whatever actions you might have against Dr. Hauserman and Philip Morris?
A. Well, not against Dr. Hauserman but against Philip Morris, yes.
Q. And then you wrote a letter to Philip Morris, didn't

1978

you?
A. I wrote a letter to Dr. Hauserman, personal and confidential letter to Dr. Hauserman, because he was on vacation or just leaving for vacation.
Q. Okay. Let me show you the letter. It's exhibit IWP 8929. I'm sure you can't read that, sir. So, I'll come in closer. Are you able to see that?
A. Oh, yes.
Q. I'll read it out loud just in case there is some difficulty. To M. Hausermann. This is to advise you that on June 25th, 1984 I retained an attorney for the purpose of taking whatever legal actions are necessary to protect my career from what I perceive as discriminatory treatment.
As we discussed, I believe that promises made to me by senior management were not kept and that the major reason for this was my wife's complaint against the company.
And you go on in the rest of the paragraph to

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talk about the importance of hand shake agreements and
things like that to Philip Morris; is that right?
A. That's right.
Q. And in the next paragraph you say, I have instructed
my attorney to prepare to file a complaint, but not to file
it pending your return from vacation, and your advice on
how to proceed, i.e., your determination with senior

1979
management on our ability to negotiate a mutually
satisfactory solution.
You said that, right?
A. I did.
Q. Okay. Now, so you would agree with me, you would
agree with me that you had now sent a letter to Philip
Morris indicating that you were considering filing an
action against the company; is that right?
A. Well, I -- yes, I mean Dr. Hauserman is part of
Philip Morris. So therefore, it implies P and B, implies
C, so, I guess.
Q. Is that scientific reasoning?
A. No, I think it's legal reasoning. But the point here
is that I asked several times during the six months prior
to this whether or not they wished to retain my services.
Virginia is an at will work state.
I would have been willing to leave at any time
if somebody had said, go ahead and leave. But, you know,
or we don't need you anymore, or we don't want you
anymore. So, this is a very strange -- it's almost like
we never talked about it because of my wife's complaint.
So, the only way according to Dr. Hausermann,
the only way I could force an issue about the resolution
of my job in light of my wife's complaint was to seek
outside assistance. There was no medium within the

1980
company to do that.
Q. Are you finished?
A. Yes.

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Q. Okay. So, you told Philip Morris that you were instructing an attorney to prepare to file a complaint but not to file it at this time, correct?
A. Correct.
Q. Now, I think you testified on direct examination that you had no idea who you might have been insubordinate to; is that right?
A. That's right.
Q. Did it occur to you that sending a letter where you threaten legal action against your company might be considered insubordinate by Philip Morris?
A. No, it did not because it was suggested by my superior that I go seek the attorney and do that. I mean, if Max had not suggested it, then I could understand somebody coming in cold and saying, but I had asked his superior, Mr. Regston previously, whether or not everything was still okay.
This was before they told me I wasn't going to get the job. And he had said yes. So, this whole issue of not getting the job was not explained to me at all.
And the only conclusion one can draw is that my wife's complaint was the cause of my dismissal.

1981
Q. Are you finished?
A. No, no one wanted to talk to me about that.
THE COURT: Let me ask the attorneys to approach once.
(The following discussion was conducted at the side bar between court and counsel, out of the hearing of the jurors, as follows:)
THE COURT: We are not going to try his dismissal case, because he had something to do with tobacco formulation.
MR. LOMBARDI: I just have a couple more questions on this, without getting into the issue of his wife's thing or --
THE COURT: Because I'm afraid I don't know what happened on that, but I think -- actually

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I think you
do your own client a disservice because you are putting
before the jury an implication that he might have been
dismissed because of his wife.
And we are not trying a Title VII retaliation
claim here, and I don't just want to get bogged down into
trying a different case.
Why don't you go on.
MR. LOMBARDI: I will, your Honor.
(The following proceedings were conducted in
open court.)

1982
Q. Now, the date on this letter, sir, was June 26, 1984?
A. That's correct.
Q. Now, is it about a week later that you learned you
were being terminated; is that right?
A. July 6th, 1984.
Q. And you went to Barry Case's office; is that right?
A. That's right.
Q. Barry Case is a management person at Philip Morris in
Richmond; is that right?
A. He was 59 at the time, yes.
Q. And you went to his office, he told you you were
being terminated; is that right?
A. Well, he read from a prepared script. Dr. Hauserman
was there. He had been called back from vacation, and Dr.
Hauserman was present during the entire conversation.
Q. Okay. And as he was telling, as Mr. Case was telling
you that you had been terminated, you were visibly upset;
is that correct?
A. Well, I didn't see myself, but I've been told I was
visibly upset. And my recollection was that I was upset,
because there are nicer ways to terminate somebody than to
call them at 11:00 o'clock in the morning on Friday and
tell them that they are going to be escorted off the
premises.
Q. And you said to Mr. Case you are making a very big

1983
mistake; is that correct?
A. That's correct, because Mr. Case didn't

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realize that
Dr. Hausermann instructed me or advised me to go obtain an
attorney. So that was a mistake, I believe, on the part of
the company, of not finding out what led to the sequence of
events.
Q. And then in the middle of all of this, you said to
Mr. Case, the die is cast; didn't you?
A. No, I didn't.
Q. Well, actually what you did was, you said it, but you
said it in Latin, didn't you?
A. I said it to Dr. Hauserman because Dr. Hauserman and
I -- Dr. Hauserman is Swiss. His first language is French
and second is German, his third is English, and he's a
Latin scholar. And we frequently trade Latin things back
and forth.
And the phrase is "Alea Jacta est," which means
fate has decided this is the way I go; the die is cast.
The Roman legions were famous for gambling. They would
roll the dice and that's what Julius Caesar said when he
decided he had to go across the Rubicon, the die is cast.
Q. When he declared war on the Roman senate?
A. No, Dr. Hauserman understood. Barry Case didn't
understand what I said, for one thing.
MR. LOMBARDI: Your Honor, I didn't ask him

1984

what Barry Case understood or didn't understand. I asked
him if that was what he said and whether he declared war
on a Roman senate.
MR. ADELMAN: Your Honor, I object.
THE COURT: Does he have personal knowledge of
that.
THE WITNESS: I think it was before my time at
Philip Morris.
BY MR. LOMBARDI:
Q. In any event, sir, you and your wife left Philip
Morris in the summer of 1984; is that correct?
A. That's correct. And before I left I think it's
important to point out that I went with Dr. Hausermann
back, and we had a meeting of all the people in

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R and D,
all 400 of them.
And I sat in the back of the room while he explained to them my termination. There was no ill will about this whole unfortunate event.
Q. And sir, you would agree that you were at least a little bit angry about what happened at the end of your tenure at Philip Morris?
A. Well, I don't know. I'm not the type of person that becomes angry. I mean, it just, yes of course I was upset, I was concerned you don't have a job. But on the way I felt sorry for Max.

1985
He had a -- Dr. Hauserman was my boss. I felt sorry for the people I was working with. So, maybe there is anger or confusion, but not any worse than any other thing that comes along in life.
Q. At a minimum, Philip Morris was not a favorite company in your household after the summer of 1984; was it, sir?
A. Not true. We still derive our pension from Philip Morris, and even recently my company loaned Philip Morris $40,000, part of a short term note. I mean, I don't bear any animosity to Philip Morris.
Q. Okay. Doctor, you, I believe, testified about some work with acetaldehyde; do you recall that?
A. Correct.
Q. And it was work that was done by Victor Denoble; do you recall that?
A. That is correct.
Q. And Victor Denoble again was not somebody in your heirarchy at Philip Morris; he was in another directorate?
A. That is correct.
Q. And the acetaldehyde, so the jury understands, is a substance that is naturally in tobacco; is that right?
A. Well, it's naturally in smoke. Acetaldehyde is a carcinogen. I don't think anybody would put it in the tobacco. There is tiny amounts may be used in the alcohol

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1986

used in the flavoring, but the predominant amount of acetaldehyde is produced from the decomposition of the sugar that's in the tobacco. It's not in tobacco, it's in the decomposition of sugar.

Q. It's something that usually arises in smoke when you burn tobacco?

A. It's not natural. But if you hadn't put the sugar in there, it would be natural, so it is not a natural consequence of tobacco.

Q. Did you take a close look at the work Dr. DeNoble did with acetaldehyde?

A. I read the reports. I was present at the meeting.

Q. The type of work that Dr. DeNoble was doing with acetaldehyde was rat testing; is that right, experiments with rats?

A. That's correct.

Q. Are you aware that the work that Dr. DeNoble did with acetaldehyde was based on results with four rats?

A. Something like that, yes.

Q. So, everything that Dr. DeNoble told you about this effect of acetaldehyde and nicotine was based on studies that had been done with four rats; is that right?

A. I don't know that everything, I mean, part of that study was done with four rats. I recall that -- I don't recall. I think it was repeated. I think there is more

1987

than one test that was performed.

Q. Do you think or do you know, sir?

A. I don't have the report. My memory isn't that good.

Q. You don't remember?

A. I could look at the report again and find out.

Q. In the report that you displayed to the jury today, that's the report that shows work with eight rats; is that right?

A. I didn't catch the number when I looked at the report.

Q. Now, the report that you displayed to the

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jury showed
actually that acetaldehyde and nicotine do not create
physiological dependence; is that right?
A. I think that's one of the statements. It's a
reinforcing activity.
Q. But it did not create physiological dependence; is
that right?
A. Acetaldehyde did not create physiological dependence;
that's correct.
Q. And that was one of the major findings that Dr.
Denoble made; is that right?
A. That's right.
Q. Now, sir, you talked about research that was done by
Myron Johnston; do you remember that -- maybe research is
the wrong word. Some reports that were done by Myron

1988

Johnson?
A. Yes, Myron Johnson summarized research data that was
available to him.
Q. Now, you were not in advertising at Philip Morris?
A. That is correct.
Q. Okay, Myron Johnson was not in advertising at Philip
Morris?
A. That's my understanding.
Q. Myron Johnston was an employee in the R and D
Department at Philip Morris?
A. Yes.
Q. And he did not work for you; is that right?
A. That is correct.
Q. He did not prepare marketing plans for the company;
is that right?
A. I don't have any knowledge of that.
Q. The Advertising Department at Philip Morris is the
department that's responsible for the creation of
advertising campaigns; is that right?
A. I don't know. I mean, the other companies that I was
with, it was outside agencies. So, I'm not sure how much
was done in Philip Morris and how much was done by
advertising agencies that Philip Morris hired.
Q. Let me put the question this way. At a minimum, you
know that advertising wasn't handled by the R and D

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1989

Department at Philip Morris?
A. That is correct.
Q. So, it wasn't raised by you or Myron Johnson; is that right?
A. That's right.
Q. I just want to show you Plaintiff's Exhibit 2279, which is one of the documents that you put up. You may recall it based on the kind of odd cover page; do you see that?
A. Yes.
Q. Can, I just want to turn you to page one, and there is a cover memo in there, isn't there from Myron Johnson to Robert Seligman; do you see that?
A. Yes.
Q. And in that cover letter Myron Johnson describes exactly what he was doing in this report; is that right?
A. He describes what he was doing, yes.
Q. Okay. And the first paragraph says, for over 15 years, certain demographic and social trends have been moving in directions favorable to industry growth. Now, one by one, these powerful social and demographic factors are turning against us, and by 1985 all will be operating against us; do you see that?
A. I see that.
Q. So, what he's doing is a demographic study of sorts;

1990

is that right?
A. That's correct.
Q. And that was Myron Johnston's training, correct?
A. Well, that's what he was relied on to do, yes. He was, I don't know if you would call him a demographer if that's even a proper word. But he wrote reports on the trends relating to how people used the product and which brands were gaining acceptance and hypothesized various reasons for that.
Q. Okay. Then on the next page, page 2, he says: It is inevitable, therefore, that industry sales will begin to decline within the next few years. Thus, Philip

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Morris USA
13 can sustain its past rate of growth only by an acceleration
14 of the rate of increase in market share.
15 While this news is not good for the industry, I
16 believe we can use these data and other data I plan to
17 report on to good advantage in order to minimize the
18 adverse effect on Philip Morris; do you see that?
19 A. Yes.
20 Q. Okay. Now, if you go to the next page, the contents,
21 you'll see attachment A is a description of data sources;
22 do you see that?
23 A. Yes.
24 Q. Okay. I believe you were looking at table 2. Do you
25 recall, do you remember that in this document you

1991
1 specifically put that up on the screen and looked at it?
2 A. I do.
3 Q. Let's turn to page 3. And down there is table 2; do
4 you see that?
5 A. Yes.
6 Q. And that, as you pointed out, talks about percent of
7 15 to 18 year olds who were current regular smokers; do you
8 see that?
9 A. I do.
10 Q. You didn't point out where that information had come
11 from, I don't believe. Do you see where that information
12 came from?
13 A. Yes, that's from a -- I don't see it here.
14 Q. It's at the top of the page, sir. Chilton's Research
15 Services?
16 A. Right.
17 Q. For the National Clearinghouse on Smoking and Health?
18 A. Yes.
19 Q. So, evidently this is information that Myron Johnston
20 obtained from Chilton Research Services; is that correct?
21 A. Yes.
22 Q. Let's go to the next page, and then he makes a
23 reference to another data source. Do you see that on the
24 next page under the heading Teenage Smoking Prevalence 75
25 to 80?

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1992

A. What page are you on, I'm sorry?
Q. The very next page. It's got the Bates number ending in 811; do you see that?
A. Yes, sir, survey research at the University of Michigan.
Q. That's a very well-respected research center?
A. Yes.
Q. And has studied smoking rates for a long time; is that right?
A. That's correct.
Q. And then if you turn back to Appendix A, you see some more on the data sources; is that right?
A. That's correct.
Q. I should call it a --
THE COURT: Let me just ask, are you disputing that they didn't do their own surveys? Do you dispute that the cigarette company or Philip Morris used publicly available data to a create the information.
MR. LOMBARDI: I'm asking if Philip Morris --
THE COURT: I'm asking the plaintiff.
MR. ADELMAN: No, your Honor.
THE COURT: Why don't we move to some other matter that may be an issue of dispute.
BY MR. LOMBARDI:
Q. Now, you talked some about biological research,

1993

correct?
A. Correct.
Q. A large amount of biological research was done by Philip Morris during your tenure there; is that right?
A. That is right.
Q. And your main complaint about biological research at Philip Morris was that you didn't get to see enough of it; is that right?
A. No, my main complaint is that what I did see never tested the finished product. And it's very difficult to know, for example, whether a Merit is safer than a Marlboro if you never test a Merit against a Marlboro.
Q. Let's talk about the kind of biological research that was done in Philip Morris in Richmond. There

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was actually
biological research done in Richmond by Philip Morris?
A. That's right.
Q. And it was done right there in the research building
were you worked, correct?
A. Right.
Q. And the type of biological research there is called
research on the cellular level; is that correct?
A. Yes, it's usually called in vitro or cell level
research.
Q. And that is an important type of testing, isn't it?
A. It is.

1994

Q. And what the testing does, you put certain components
in contact with certain types of cells, and you see whether
damage is done, right?
A. Not to get in code words again, but see, you see if
it causes mutations and researches in all types of cells,
hamster cells, bacteria, the Ames test, and so on.
Q. And incidentally, the type of testing that you find
more important are that kind of cell testing and then human
experience; is that right?
A. Well, no. You have to do the animal testing too. I
mean, they all provide the information that you need, but
yes, human experience is the ultimate arbiter of whether or
not you are making progress.
Q. And you are aware that the public health community,
throughout the time you were at Philip Morris, was saying
that the way to determine whether, for instance, low yield
cigarettes are safer is to look at epidemiological data; is
that right?
A. Yes, which showed that they didn't help.
Q. And epidemiological data is statistical data on human
experience; is that right?
A. That's correct.
Q. Now, at Philip Morris the research that was done on
cell testing you were able to see; is that right?
A. On components, not on finished products.

1995

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Q. And that testing, the research was maintained in files at Philip Morris; is that correct?
A. It was, yes.
Q. And these files were available; those tests were available?
A. They were, and that's how, for example, you would find out, for instance, if you removed nitrate from the RL sheet, if the sheet itself with and without the nitrate was safer. You still wouldn't know if it was safer in the final product.
Q. Now biological research was done by Philip Morris at a place called INBIFO?
A. That's correct.
Q. INBIFO is an acronym for some German words?
A. That's correct.
Q. Which stands for Institute of Biological Research or something like that?
A. I've heard of that, yes.
Q. You were aware of INBIFO even before you got to Philip Morris?
A. That's right.
Q. Before at Lever Brothers you became aware of that testing facility, biological testing facility.
A. It was know around the world, yes.
Q. And INBIFO was a testing laboratory in Europe?

1996

A. That's right.
Q. INBIFO did biological testing for companies other than tobacco companies, in the 60's when you were at Lever Brothers, is that right?
A. That's right.
Q. And did you know that INBIFO was owned by a company called TWG?
A. I didn't know who the exact owners were.
Q. Did you know that INBIFO was owned in the 60's by an American company?
MR. ADELMAN: Objection, he's testifying, your Honor.
THE COURT: Overruled.
BY MR. LOMBARDI:
Q. Did you know that INBIFO in the 1960's was, on the other hand, owned by an American company?
THE COURT: Do you know who owned it?

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THE WITNESS: No, I don't know who owned it.
THE COURT: Why don't we move on, he doesn't know.
MR. LOMBARDI: I'm sorry.
THE COURT: He says he doesn't know who owned it.
BY MR. LOMBARDI:
Q. INBIFO did a whole battery of testing for Philip

1997

Morris, isn't that right?
A. That's my understanding, yes.
Q. Your understanding is that INBIFO did in vitro testing, is that right?
A. Yes.
Q. It did in vitro testing?
A. Yes.
Q. It did mouse skin painting?
A. That's in vitro testing.
Q. But mouse skin painting was done at INBIFO?
A. Yes.
Q. And animal inhalation studies were done there?
A. That's right.
Q. You didn't see the reports that came from INBIFO, as I understand your testimony, is that right?
A. That's right.
Q. Okay. And you wanted to see them, is that right?
These reports?
A. We were doing research on the products; yes, you want to see them.
Q. And you never saw them over the whole course of your time at the company, is that right?
A. No, that's not right. I think I saw one or two, the ones that Tom Osdene showed me.
Q. Okay. Now, the fact that you weren't able to see

1998

this, this information, because that was in Dr. Osdene's camp, is that right?
A. That's right.
Q. The fact that you weren't able to see it was somewhat inconvenient, but it's something you felt you could work with during your time at Philip Morris, isn't it that right?
A. Provided the answers are made available to you and

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you have the answers I felt I could work with what they have.
Q. Now you, yourself, never actually went to INBIFO?
A. That is correct.
Q. But you met INBIFO scientist who came over to Richmond, is that right?
A. I don't recall that, maybe.
Q. You never saw INBIFO's records, is that right?
A. That is correct.
Q. Now, you made reference to Dr. Osdene making comments about destroying some documents from INBIFO. Do you remember that?
A. He took one back for me and said he had to destroy it; at least that one, yes.
Q. Did you ever actually see Dr. Osdene destroy a document from INBIFO?
A. No, not personally watch him do it.

1999

Q. You have no knowledge whether, even assuming Dr. Osdene destroyed a document from INBIFO, whether that was the only copy of the document, isn't that right?
A. I'm not sure I understand the question.
Q. Well, you don't know whether INBIFO maintained full and complete records of all it's reports, is that right?
A. Based on information I had at the time, limited to 1984.
Q. That's what you are here to testify about?
A. As of 1984 I can't answer that question. I mean, I didn't know as of that time.
Q. Okay, now, Philip Morris also did biological research at outside laboratories in the United States, isn't that right?
A. Directly?
Q. Yes?
A. I was under the impression that was done through at least after the time that I got there, earlier they did it outside, but I thought it was done either through CTR or Center for Tobacco Research or the Tobacco Institute.
Q. Okay. Are you familiar with testing done by labs like the Hazleton Lab, animal inhalation studies?

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A. Yes, I am.
Q. Those are called contract labs, right?
A. Yes.

2000

Q. And that means you hire them for a one time set of
tests or several tests and they do work for a bunch of
different companies, is that right?
A. That's correct.
Q. Now, contract labs frequently have more expertise in
a particular type of testing than does the client that goes
to them, is that right?
A. That's correct.
Q. And, for instance, a contract lab might have a
specialty in animal inhalation studies, is that right?
A. They could have.
Q. And animal inhalation studies do require some
specialization, is that right?
A. All animal studies require specialization, yes.
Q. You need a special type of -- you need to find an
animal that you could work with, is that right?
A. Well, there are standards for keeping a lab like the
rat studies that Denoble did. You have to set up an entire
lab and it cost money to do that, but we did it in that
case.
Q. And you have to get equipment to work with to
actually perform the inhalation tests, is that right?
A. That's correct.
Q. And you need people who can specialize in that, is
that right?

2001

A. That's right.
Q. And when you do that type of work, in fact you
recommend that type of work, don't you, to companies to go
to outside labs to do that type of work?
A. I recommend to do it both ways. Typically when I was
at Lever Brothers we would have our own laboratories and we
would run the tests ourselves, and we would have those
confirmed by an independent laboratory so no one could say
only if our laboratory could we get the results we wanted.

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Q. It's more credible when you get results from an outside laboratory, is that right?
A. You need to do both because they can make a mistake, too.
Q. And when you go to an outside laboratory you are essentially paying for an objective review, is that right?
I'll strike the question.
You have recommended that people go to outside laboratories to do testing, right?
A. Yes; yes, I have.
Q. Okay. Sir, you talked some about some work you did, some projects you did that didn't go to conclusion at Philip Morris; is that right?
A. That's right.
Q. And before we talk specifically about those, it's true, isn't it, sir, that designing a safer cigarette is

not an easy matter?
A. Well, a cigarette is a complicated device. There is about 57 different variables that you have to watch out for. So, in that sense, other than for people with a lot of expertise, it's difficult, yes.
Q. It's a very challenging problem to come up with a cigarette that addresses all the health concerns that people have raised; is that right?
A. That is right.
Q. And there were no perfect solutions to the problem?
A. We are not trying to make it safe. There is even a question whether you can do that. The issue is safer, not safest or safe.
Q. And there are tradeoffs whenever you try to come up with a safer cigarette; is that right?
A. There is always tradeoffs in regard of one kind of -- like you might have to trade some long term effects for short term effects, or vice versa. That's true in any product of this type.
Q. Okay. And some of the tradeoffs relate to trying to figure out what is the exact bad constituent of smoke that you want to remove; is that right?

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A. Well, no. I mean, I think we recognized the ones you want to remove are the most virulent. The mutagens and carcinogens, a lot of those which have been identified, I

2003

don't think there is any confusion about which ones we need to remove.
Q. For instance, if you try to remove one of those, then you might inadvertently, or just because of the complexity of the matter, increase another one; is that right?
A. And that's exactly why you have to test the final product to make sure you haven't inadvertently caused a negative change when you try to make a positive one.
Q. So, for instance, you know what a PAH is; is that right?
A. Yes I do.
Q. PAH is one of constituents of smoking pinpointed by the public health community as causing a problem?
A. PAH is a class of polynuclear aromatic hydrocarbon.
So, it's not describing a single compound.
Q. Fair enough. But one thing you could do to try to remove PAH is to add nitrates to the tobacco; is that right?
MR. ADELMAN: Excuse me, your Honor. I think this is outside the scope of direct.
THE COURT: I'm going to sustain the objection.
BY MR. LOMBARDI:
Q. Let me turn, sir, to the NOD program, naturally occurring denitrification, that you referred to earlier?
A. Yes.

2004

THE COURT: How much more do you have?
MR. LOMBARDI: I have a ways to go.
THE COURT: You are going to have to pick it up. You are going to have to move it more directly. If you have specific questions on particular points, why don't you try to get to them, rather than kind of

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generalized discussions about the background.
MR. LOMBARDI: I'll do that, your Honor.
Q. You talked about the naturally occurring denitrification?
THE COURT: We have already gotten to that. Go on to your next question.
Q. Sir, at Philip Morris when you arrived there Philip Morris had techniques for removing nitrates from tobacco?
A. That's correct.
Q. They had a program called crystallization.
MR. ADELMAN: Your Honor.
THE COURT: I think it is beyond the scope.
MR. LOMBARDI: He said --
THE COURT: I understand your position. I sustained the objection. It is beyond the scope. If you want to call him back in your case and explore it, you can.
MR. LOMBARDI: May I continue on to the NOD program?

2005

THE COURT: He spoke to that, but let's try to stick to things brought up by the plaintiff on direct.
BY MR. LOMBARDI:
Q. I will, your Honor. You said that the NOD program was ready to go in approximately 1980?
A. I said Susan Dobberstein's conclusion was ready, conclusion in 1980, who was commissioned to do the study, says, as we show, that it was really ready to go.
Q. Isn't it true, sir, that the program continued after 1980 and problems were being addressed along the way?
A. The program continued, and I call that paralysis by analysis. The question is whether it was good enough to save lives or whether you need to continue to study it.
Q. There are people at Philip Morris who believed that more work needed to be done on the program before it could be put into action; is that right?
A. That is correct.
Q. And so, for instance, in March of 1982, the program was still ongoing; is that correct?

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20 A. Yes.
21 Q. Okay. I'm going to show you IWP 9610, I don't know
22 if you can read the date. I'll read it to you, March 19th,
23 1982; do you see that?
24 A. I do.
25 Q. And you can see on the "re" line it relates to the

2006
1 NOD project; do you see that?
2 A. Yes.
3 Q. Okay. Let's go to the next page and see on that page
4 the objective of this memo is to provide an overview of the
5 status of the NOD project for management review; do you see
6 that?
7 A. Yes, I do.
8 Q. And you see that it goes, I'm not going to read
9 through all these conclusions, but you see there are a
10 bunch of points made about how the project is progressing?
11 A. I do.
12 Q. So, as of 1982 the project was still ongoing; is that
13 correct?
14 A. Yes.
15 Q. By April of 1983 the project was still being worked
16 on by Philip Morris; is that right?
17 A. That is right.
18 Q. Here is another document, see, it's dated April 22nd,
19 1983?
20 A. Yes.
21 Q. Okay. And I'll just turn you to save time to the
22 addendum, where it says, "although we are far from
23 mastering an understanding of the intricacies of this
24 microbially mediated and denitrification process, we have,
25 with the help of an ever growing community of

2007
1 collaborators, been able to substantially improve our
2 results, as far as proceeding in the current work project
3 in the NOD process.
4 Do you see that?
5 A. And at the time I made the point you don't have to
6 understand how something works, if it works well. And it's
7 useful to put it into effect.
8 I would also point out Philip Morris

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filed for
a patent subsequent to that '83 or '84 and, as you know,
when you file for a patent you make a declaration,
deposited legal declaration that the process has utility
and that it works.
Q. And they were still working on the NOD project at the
time you left the company; is that correct?
A. That is correct.
Q. Okay. Phillip Morris spent enormous time and
resources on the NOD project; is that correct?
A. Yes.
Q. Now, you also talked about polonium 210; do you
remember that?
A. I do.
Q. There are actually a few programs that deal with
polonium 210 at Philip Morris; isn't that right?
A. Well, I remember two.
Q. Okay. And it was a good thing that Philip Morris was

interested in looking at the removal of polonium 210 in
your view at the time you were there; is that right?
A. Absolutely.
Q. And one of the programs was a program to use genetic
engineering to try to make the tobacco leaf so that it
wouldn't have polonium 210 stick to it; is that right?
MR. ADELMAN: Your Honor, may counsel approach?
THE COURT: What for?
MR. ADELMAN: This is again outside the scope
of even his testimony, limited as it was, about the
polonium project. He's getting into the details.
THE COURT: I'm not sure, is it really
important to the defendant's case to go into the nuts
and -- you know, there was some testimony, so to a degree
it's not beyond the scope, but does this really move your
case anywhere to have the jury understand the intricacies
of how it worked?
MR. LOMBARDI: Judge, I'm not going to get into
the intricacies of how it worked. I do think it is

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important to establish that Philip Morris did work on this project.

THE COURT: I think he testified to that. If you want to ask that generally. I'm trying to move this along to a conclusion today before 7:00.

MR. LOMBARDI: Yes, your Honor.

2009

Q. Polonium 210 actually by 1981 during your time at Philip Morris had been viewed as not a very, as at best, a questionable risk factor by the Surgeon General; is that correct?

A. The Surgeon General, but Philip Morris, we had better information.

Q. Okay. Now, up until the time that you left Philip Morris, up until the time you left Philip Morris, polonium 210 you knew from the literature was not considered a major problem as far as tobacco was concerned; is that right?

A. No; we considered it a major problem within Philip Morris up to the time I left.

Q. Okay.

A. And the literature, we knew more about it than they did.

Q. Okay. And you knew that polonium 210 was something that had been known about for years and years, even prior to the time you got to Philip Morris; is that right?

A. I knew that, yes.

Q. Sir, you mentioned the nicotine analog program; do you recall that testimony?

A. Yes.

Q. That was another good program that Philip Morris had in place?

A. Yes.

2010

Q. Okay. It was a program to try and address certain health effects of smoking?

A. Yes, the cardiovascular effects.

Q. And it required sophisticated science to do this?

A. Yes.

Q. And it required the programs in place for a number of years?

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A. Many years.
Q. And Philip Morris spent a large amount of money on the program; is that right?
A. That's correct.
Q. Now, sir, you talked about some of the projects that didn't go through. There were lots of projects that went through that had the effect of making cigarettes safer; is that correct?
A. Not that we can prove.
Q. Okay. You can't prove because the epidemiological evidence isn't in yet; is that right?
A. No, the epidemiological evidence is in, but it didn't make a difference.
Q. Sir, at the time you were at Philip Morris you were working through the hypothesis that it would be a good idea to lower the tar and nicotine yields of cigarettes; is that right, is that correct?
A. Yes.

2011

Q. And one way that you did that, you personally did work with reconstituted tobacco; is that right?
A. People working for me, you mean.
Q. Yes?
A. People working for me did, yes.
Q. And that helped reduce tar and nicotine levels?
A. Yes.
Q. Did work with expanded tobacco; is that right?
A. Yes.
Q. And that reduced tar and nicotine levels?
A. That's correct.
Q. And you personally worked on developments in expanded tobacco; is that right?
A. Again, personally as people who have worked for me.
Q. People who worked for you did?
A. Yes.
Q. Came up with a program called DIET; is that right?
A. Yes; that's right.
Q. That was a work in expanded tobacco that you were proud of?
A. That's right.
Q. People who worked for you in the physical research division did work with filters?
A. That's correct.
Q. Okay. And that helped bring down tar and nicotine

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yields; is that right?
A. We don't know that for sure.
Q. You did work on ventilation, you mentioned your direct examination; is that right?
A. That's correct.
Q. And you specifically you did work to develop a laser method of putting ventilation holes in; is that right?
A. That's correct.
Q. And that helped to improve the cigarette; is that right?
A. Yes, made it more consistent, more uniform.
Q. And it helped make ventilation more effective?
A. Yes, and it also saved probably about 60 million dollars a year.
Q. And people at Philip Morris under you also did work with paper porosity; is that correct?
A. That's correct.
Q. And paper porosity is another way you brought down tar and nicotine yields; is that right?
A. It was primarily for reducing CO, but it brings down tar and nicotine yields.
Q. People at Philip Morris also worked on what is called non-conventional cigarettes under you; is that right?

MR. ADELMAN: Objection, your Honor, I think we have far exceeded the bounds now.

THE COURT: Sustained.
MR. LOMBARDI: Nothing further, your Honor.
MR. ADELMAN: I have no further questions.
Thank you.
THE COURT: Thank you. You can step down. Do you wish to make any interim argument?
MR. ADELMAN: Yes.
THE COURT: Go ahead, Mr. Adelman. Again, this is, I caution this is not evidence but an opportunity to comment on what evidence has been offered.
MR. ADELMAN: Ladies and gentlemen, this witness was the first among those who testified from the inside, the inside. Dr. Farone worked at Philip Morris

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for 8 years. And I hope you listened carefully to what he said, and he said it several times, but a very important word, and that was agreement.

You are going to consider this evidence at the end of the case and consider such issues as conspiracy and other violations. He said that everybody there a in senior management, everybody there he talked to, that they understood nicotine was addictive to the tobacco, injurious to health.

Compare what you know already about that Philip Morris was saying about those issues. Furthermore, the agreement also is important because he learned from Osdene

2014

and others that there were agreements in place among all of these defendants to do the critical biological research overseas because they wanted to hide it if it turned bad. That's what the exhibit said that we put up there. There was an agreement not to do whole product testing in the United States because they wanted to hide it.

That, in essence, is what this case is about. We are fortunate to be able to have this witness here to tell you about it. But you saw him; you heard him. He has no malice, no concern for himself. He's not here promoting any cause. And he's quite fair about it.

He got terminated for insubordination, so they say. What's the insubordination? You think about it overnight. You think about it. I suggest to you all along the way he sees what's going on, he's a decent, honest scientist. And he says why are you doing this and hiding documents and burying them and sending them away. Jury members, that's the insubordination. Consider that when you consider this case.

And finally, you recall the document that we put up, the handwritten document, Dr. Osdene's

http://legacy.library.ucsf.edu/tid/pyp35a00/pdf Source: http://www.industrydocuments.ucsf.edu/docs/mrxd0001

handwritten
notes. This gentleman came in and identified those as Dr. Osdene's and they matched exactly what he heard from the lips of Dr. Osdene.

THE COURT: Thank you.

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Mr. Lombardi.

MR. LOMBARDI: Thank you, your Honor.

Mr. Farone's testimony is most relevant to the safer cigarette allegations in this case. William Farone sat on the stand, obviously hostile to Philip Morris at this point, but sat on the stand and told you that Philip Morris had a department that was devoted to safer cigarettes and into researching a safer cigarette. They had 200 people in that department.

They spent a lot of money. He told you a little bit about the programs. Some of them failed, but some of them were successful. Ask yourself this. If there was a conspiracy not do to develop a safer cigarette, why in the world would Philip Morris have a department devoted to it, and why would they spend the money to do it.

Counsel said just a moment ago that the evidence was he left because of something he saw that was wrong or bad at Philip Morris. That is not what he told you. He left because he was fired. He wanted to be at Philip Morris. He wanted to be the Vice President of Research and Development.

And the spin he puts on events that took place in other departments today, after he's been fired, is not worthy of much weight. Think about where William Farone

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is today. Think about how he left Philip Morris and think about the money that was spent to develop safer cigarettes while he was there. Thank you.

THE COURT: Do you have anybody

http://legacy.library.ucsf.edu/tid/pym05a00/pdf Source: http://www.industrydocuments.ucsf.edu/docs/mrxd0001

ready, do you
have any witnesses?
MR. ADELMAN: No.
THE COURT: We are going to recess for the
night. At ten 'til 8:00 tomorrow morning, same
admonitions apply, right. Don't talk about the case among
yourselves. Don't talk about the case in Latin with
anybody else. Don't form any opinions or express any.
Leave the pads down, and we'll see you tomorrow morning.
(The hearing was adjourned at 5:10 p.m.,
Monday, March 1, 1999 until 8:00 a.m. Tuesday, March 2,
1999, at which time the following proceedings were
conducted in open court.)

C E R T I F I C A T E

I, Richard G. DelMonico, Official Court Reporter
in and for the United States District Court, for the
Northern District of Ohio, Eastern Division, do hereby
certify that the foregoing is a true and correct transcript
of the proceedings herein.

_____

Richard G. DelMonico,
Official Court Reporter

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